



A Study to Identify Evidence-Based Strategies for the Prevention of Nursing Errors

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Executive Summary

Context: The Fiscal Year 2005 Budget required the Massachusetts Board of Registration in Nursing (Board) to prepare a compilation of complaint cases involving preventable medical errors that were associated with harm to a patient or health care provider for the purpose of assisting health care providers, hospitals and pharmacies to modify their practices and techniques to avoid error.

Design, Setting, and Participants: This descriptive study was designed to examine the incidence and nature of nursing errors among 34 RNs and 44 LPNs selected from the 661 complaint cases closed by the Board between January 1, 2005, and December 31, 2005. This sample was chosen by applying a three-tiered selection process in which 97 complaint cases involving 52 RNs and 45 LPNs were initially identified. On review of the practice setting present in each of the 97 complaint cases, it was noted that 78 of the cases involved both RNs and LPNs practicing in nursing homes. Of the remaining 19 complaint cases, 18 involved RNs who practiced in a variety of institutional and community-based settings and only one LPN who practiced in a physician's office. Although the resulting sample was small, a decision was made to focus data analysis on the 78 nursing home-based cases since they represented 80% of the 97 complaint cases meeting the initial three-tier selection criteria and included both RN and LPNs. The 78 nursing home-based cases represented 12% of the 661 complaint cases closed by the Board in Calendar Year (CY) 2005. Using a case analysis format, data was collected using a modified Taxonomy of Error, Root Cause Analysis and Practice Responsibility (TERCAP™) audit instrument¹. For the purpose of this study, a nursing error was defined as the failure of a planned *nursing* action to be completed as intended or use of a wrong *nursing* plan to achieve an aim (adapted from the Institute of Medicine's 1999 *To Err Is Human, Building a Safer Health System* definition of "error"²).

Objectives: This study was designed to 1) Describe the characteristics of the nurse, patient and practice setting involved in the complaint case; 2) Categorize the nursing error and harm outcome; 3) Examine possible causative or contributive factors at two levels: the nurse and the practice environment; 4) Identify actions taken by the Board and the nurse's employer in response to the nursing error; and 5) Recommend evidence-based strategies to reduce or prevent the occurrence of nursing errors.

Results: In this study of 78 complaint cases involving 34 RNs and 44 LPNs, seven nursing error categories were identified in the care of 62 primarily female patients who were residents of 50 nursing homes (average: 131 beds; median: 125 beds) located in Massachusetts. The nurses were primarily female (91%), 44 years of age, graduates of US nursing programs and involved in a single incident nursing error (90%). At the time the nursing error occurred, RNs had been licensed an average of 15 years (median: 9.75 years) while LPNs were known to have been licensed for an average of 11 years (median: 8 years). Seven of the 44 LPNs were licensed for 12 months or less (average was 6 months); none of the RNs had been licensed for 12 months or less. Twenty-two (65%) RNs received their basic nursing education at the Associate Degree level. Seventy (90%) of the 78 nurses were known to hold direct care positions; job tenure averaged 3.6 years. Seventeen (22%) of the 78 nurses were employed by temporary staffing agencies. Nursing errors occurred most often between 5:00 p.m. and 6:30 p.m. followed by 5:00 a.m. and 6:30 a.m. Most nurses were assigned to work an eight-hour shift from 3 p.m. to 11 p.m. when the nursing error occurred.

¹ National Council of State Boards of Nursing. (2005). *Taxonomy of Error, Root Cause Analysis and Practice Responsibility* (Version 02182005). Chicago, IL: Author. Used with the permission.

² Kohn, L., Corrigan, J., & Donaldson, M. (Eds). (1999). *To err is human: Building a safer health system*. Washington, DC: National Academy Press. Retrieved July 5, 2006 from the World Wide Web: http://fermat.nap.edu/openbook.php?record_id=9728&page=210.

Nursing errors by 46 (59%) of the 78 nurses were associated with harm to 37 patients including nine deaths. None of the nursing errors were associated with harm to the nurse. Stress and a “high volume of work”; inexperience with particular clinical events, procedures or conditions; and a lack of familiarity with the practice setting were cited most often by the nurses as contributing to the nursing error.

Errors in medication administration were the most common error category overall as well as among the seven novice LPNs and the 17 nurses employed by temporary staffing agencies. 50% of the medication administration errors were associated with harm to 15 patients including one death. The majority of medication administration errors were associated with the nurse’s violation of one or more of the “five rights and three checks” of medication administration (administration of medication to the wrong patient because the nurse failed to verify the patient’s identity was the most common violation). Practice environment or “system” factors associated with medication administration errors included frequent interruptions during the medication administration process and the lack of policies requiring “independent double checks” and “read backs”. Medication administration errors among the novice LPNs were also associated with the lack of consistently assigned preceptors and the adequacy of the novice nurses’ transition program.

Errors in clinical judgment were the second most common error category and were associated with harm to 12 patients including six known deaths. Clinical judgment errors were associated most frequently with the nurse’s knowledge deficit, the nurse’s failure to recognize or correctly interpret the implication of the patient’s signs and symptoms and the nurse’s failure to provide adequate patient monitoring. The health care team’s lack of awareness of the patient’s goals, information missing from patient records and communication breakdown including at change-of-shift hand-offs were the most common practice environment-related factors associated with clinical judgment errors.

Overall, the Board imposed 27 remedial sanctions in the interest of public safety; all nurses retained their license to practice. The Board dismissed the remaining 51 complaint cases following its consideration of substantiating evidence.

Conclusions and Recommendations:

Nursing competence and the infrastructure of the nurse’s practice environment have implications for safe nursing practice and the prevention of nursing errors. In addition, this study indicates that while the Board may be perceived by some nurses as punitive, its actions following its investigation and evaluation of nursing complaints do not bear this out. Evidence-based error-prevention strategies focused on medication administration, heat therapy, resuscitation directives and standardized hand-off communications for use by individual nurses, educators, employers and regulators are recommended. Examples include collaborative efforts among nurses, employers, professional associations, risk management and regulatory agencies to advance quality improvement and the collection and dissemination of data, and the creation of non-punitive practice environments that support voluntary error reporting; active participation by individual nurses in interdisciplinary root cause analyses; systematic reviews of clinical standards; conducting practice audits; and the issuance of patient safety alerts.

1. Introduction

The Massachusetts Board of Registration in Nursing (Board) is created and authorized at General Laws (G.L) chapter 13, sections 13, 14, 14A, 15 and 15D, and G.L. c. 112, §§ 74 through 81C to protect the health, safety and welfare of the citizens of the Commonwealth through the regulation of nursing practice and education. Members of the Board are committed to consumer access to safe patient care that is provided by qualified Licensed Practical Nurses (LPNs), Registered Nurses (RNs), and Advance Practice Registered Nurses (APRNs) including Nurse Anesthetists, Nurse Midwives, Nurse Practitioners and Psychiatric Nurse Mental Health Clinical Specialists.

In August 2005, the Board approved its three-year strategic vision, mission and goals. Assuming a leadership role in patient safety, and regulatory innovation and outreach are among its primary initiatives. Some of the activities that support the achievement of these initiatives include the Board's active collaboration with other regulatory agencies and private health care-related organizations to advance quality improvement, and the collection and dissemination of data to facilitate the development and implementation of evidence-based patient safety programs.

Consistent with the Board's strategic initiatives, Chapter 149, section 2 of the Acts of 2004 (Fiscal Year 2005 Budget) requires the Board to "prepare a compilation of complaint cases involving preventable medical errors that were associated with harm to a patient or health care provider for the purpose of assisting health care providers, hospitals and pharmacies to modify their practices and techniques to avoid error." In response, this report provides an analysis of selected complaint cases that involved a nursing error where actual or potential harm resulted to the patient or nurse and that were closed by the Board between January 1, 2005, and December 31, 2005, in order to:

- Describe the characteristics of the nurse, patient and practice setting;
- Categorize the nursing error and harm outcome;
- Examine possible causative or contributive factors at two levels: the nurse and practice environment;
- Identify actions taken by the Board and the nurse's employer in response to the nursing error; and
- Recommend evidence-based strategies for use by individual nurses, nurse educators and employers, and regulatory agencies to reduce or prevent the occurrence of nursing errors.

2. Background

A. Massachusetts Board of Registration in Nursing

Created by statute in 1910, the Board's current composition is established by G.L. c. 13, § 13 to include nine RNs (including two APRNs), four LPNs, a licensed physician, a licensed pharmacist, and two consumers. By statute, each nurse member is required to possess at least eight years of nursing experience. Section 13 also specifies that the Board's RN and LPN members represent practice in acute care, long-term care and community health settings and further designates nurse representation by:

- direct patient care providers;
- nurse educators from each level of education whose graduates are eligible for RN and LPN licensure by examination (baccalaureate and higher degree entry-level programs are considered one level); and
- one nursing service administrator responsible for service-wide policy development and implementation.

Throughout Calendar Year 2005, the Board was comprised of 12 appointed members including eight of the nine RNs (including 2 APRNs), two of the four LPNs, a licensed pharmacist and a consumer. Of the appointed RNs and LPNs, there were direct care providers and nurse educators from Practical Nurse, Hospital-based RN, Associate Degree (RN), and Baccalaureate Degree (RN) education. In addition, a representative of nursing service administration held a Board appointment through May 2005. A second consumer representative also served through August 2005. Appointments to the following seats were not filled during Calendar Year 2005: two of the four required LPNs and a licensed physician.

G.L. c. 13, s. 13, authorizes the Board to protect the health, safety and welfare of the citizens of the Commonwealth through the regulation of nursing practice and education. The Board's public protection mandate is carried out in a variety of ways including initial and renewed nurse licensure, and the establishment of standards for the operation of nursing education programs that prepare graduates for practice as an RN or LPN. The Board is also responsible for the enforcement of the laws and regulations governing nursing practice. One means by which the Board accomplishes this is through its evaluation of and action on complaints filed with the Board regarding an individual nurse's practice. Complaints are submitted by employers and other regulatory agencies such as the Division of Health Care Quality and the state Drug Control Program, and less frequently by patients, their family members and other concerned individuals.

Based on its investigation, the Board may dismiss a complaint or impose remedial requirements (commonly referred to as discipline) in the form of a reprimand, probation, suspension, surrender or revocation of a nurse's license to practice nursing. A reprimand, the lowest form of remedial action, is a formal acknowledgment by the Board to the nurse that a practice-related error was made. It is designed to focus the nurse's attention on the specific aspect of practice-related breakdown. A reprimand places no restrictions on the nurse's license or ability to continue to practice. Alternatively, a nurse whose license to practice is placed on probation by the Board may continue to practice nursing in Massachusetts. The nurse placed on probation must practice under Board-specified terms and conditions (e.g., remedial education and supervised practice).

B. Complaint Resolution Activities

A total of 125,787 nurses (106,165 RNs and 19,622 LPNs) held current Massachusetts nurse licensure as of December 31, 2005. Between January 1, 2005, to December 31, 2005 (CY 2005), the Board evaluated and resolved 661 complaint cases. This represents only 0.5% of the total number of all Massachusetts-licensed nurses as of December 31, 2005. Each case involved a complaint received by the Board alleging that a nurse had engaged in conduct related to the practice of nursing that violated legal or professional standards. The categories of these allegations, as identified on receipt by the Office of Investigation, Division of Health Professions Licensure (DHPL), were varied and included, as examples, conduct related to a nurse's clinical competency, drug diversion, drug abuse, and fitness to practice.

The Board's duty as well as its goal in investigating and evaluating complaints is to protect the public, not to punish the nurse who makes an error. In each of the 661 complaint cases closed in CY 2005, the Board sought to determine the existence of a practice error and when needed, to implement remedial requirements that would promote the nurse's return to safe, competent practice. Of the 661 complaints that it evaluated in CY 2005, the Board dismissed 380 (57.5%) of the complaint cases based on the Board's determination that the conduct complained of did not warrant disciplinary action. The Board imposed remedial actions in 272 (41.1%) complaint cases including 50 reprimands (7.6%), 49 probations (7.4%), 18 suspensions (2.7%) and 59 revocations (8.9%) in the interest of public safety. The nine (1.4%) remaining complaint cases included those in which a nurse's license had been placed on hold in accordance with the licensee's consent agreement, and duplicate cases.

The Board's determinations that Board-imposed remediation in any form was not warranted were based on its consideration of substantial evidence regarding: the nature and related circumstances of the nurses conduct, applicable remedial activities successfully completed by the nurse, employment performance evaluations of the nurse prior to and following the error, any acknowledgment by the nurse of the practice error and its significance, prior repeated or continuing practice-related issues, associated practice environment or systems-related factors and the need for an official record of the nurse's practice-related error in the public interest. Appendix 1 provides a summary by allegation category³ and Board action on the 661 complaint cases closed in CY 2005.

³ Classified by the DHPL as a Nature Code

3. Methodology

The study used a case analysis method to examine the incidence and nature of certain nursing errors by RNs and LPNs in selected complaint cases closed by the Board in CY 2005.

Specifically, it analyzed sample complaint cases to:

1. Describe the characteristics of the nurse, patient and setting;
2. Categorize the nursing errors and harm outcome;
3. Examine possible causative or contributing factors at two levels: the nurse and practice environment;
4. Identify actions taken by the nurse's employer and the Board, or both, in response to the nursing error; and
5. Recommend evidence-based error prevention strategies for use by individual nurses, nurse educators and employers, and regulatory agencies to reduce or prevent the occurrence of nursing errors.

For the purpose of this study, a nursing error was defined as the failure of a planned *nursing* action to be completed as intended or use of a wrong *nursing* plan to achieve an aim⁴.

A. Study Sample

The study sample was selected by initially applying a three-tiered selection process to the 661 complaint cases closed in CY 2005; the cases involved 442 (64%) RNs and 239 (36%) LPNs. The first tier criterion required the selection of those complaint cases that were assigned one of five allegation codes⁵: Failure to Adhere to Practice Standards, Medication Administration Error, Unprofessional Practice, Patient Neglect and Improper Documentation of Controlled Substances. Of the 661 complaint cases, a total of 345 met the first tier criterion.

The second tier criterion was applied to the 345 complaint cases to exclude cases that involved conduct that had originally resulted in discipline in another state, that involved drug diversion, drug and alcohol abuse or impaired practice, or that were dismissed based on insufficient evidence, lack of evidence or admission to the Board's Substance Abuse Rehabilitation Program. One hundred and fifty-two (152) of the 345 complaint cases that met the first tier criterion, remained after the second tier exclusion criteria was applied.

The third tier criterion was applied to the 152 complaint cases and required the presence of a nursing error as identified from a review of the case file and excluded complaint cases in which there was purposeful or malicious conduct. Additional cases involving alcohol and drug abuse were identified and excluded during the review of case files at this tier. Of the 152 complaint

⁴ Adapted from the Institute of Medicine's 1999 *To Err Is Human, Building a Safer Health System* in which an error is defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim. Source: Kohn, L., Corrigan, J., & Donaldson, M. (Eds). (1999). *To err is human: Building a safer health system*. Washington, DC: National Academy Press. Retrieved July 5, 2006 from the World Wide Web: http://fermat.nap.edu/openbook.php?record_id=9728&page=210.

⁵ Selected by identifying the 10 most commonly occurring allegation categories (referred to as nature codes) assigned to complaint cases that were closed by the Board during CY 2005 (major and minor medical errors were combined into one code, "medication administration error") and eliminating those nature codes that involved purposeful, malicious conduct, drug diversion or drug and alcohol abuse (i.e. Drug Diversion, Patient Abuse, Discipline in Another Jurisdiction, Drug Abuse and Practicing While Impaired). The allegation is categorized when the complaint is first received by the Board. The allegation category or nature code is assigned by the Supervisor, DHPL Office of Investigation, a masters-prepared nurse with 32 years of nursing experience.

cases that met the second tier criterion, a total of 97 cases involving 52 RNs and 45 LPNs met this third criterion.

The practice setting in which the nursing error occurred is only available on review of the complaint case file. On review of the practice setting present in each of the 97 complaint cases (Table 1 below), it was noted that 78 (80%) of the 97 cases involved both RNs and LPNs practicing in nursing homes at the time the nursing error occurred, while the remaining 19 cases involved RNs practicing in a wide variety of institutional and community-based settings and only one LPN practicing in a physician's office. Although the resulting sample was small, a decision was made to focus the study on the 78 nursing home-based cases since they represented 80% of the 97 complaint cases meeting the initial three tier selection criterion and included both RN and LPNs. Consequently, the final study sample consisted of 78 cases involving 34 RNs and 44 LPNs identified as practicing in nursing homes that were ultimately selected from the 661 cases closed in CY 2005.

Table 1: Nursing errors by practice setting

Practice Setting	# LPNs involved in error	# RNs involved in error	Total # LPNs & RNs involved in error	% LPNs & RNs involved in error (N = 97)	% selected from 661 CY 05 closed cases
Nursing Home	44	34	78	80%	12%
Hospital	0	11	11	11%	2%
School	0	4	4	4%	1%
Health Care Provider Office	1	1	2	2%	0%
Assist Living	0	1	1	1%	0%
Home care	0	1	1	1%	0%
Total	45	52	97	100%	15%

A. Data Collection

The data for this study was collected using a modified version of the National Council of State Boards of Nursing (NCSBN) Taxonomy of Error, Root Cause Analysis and Practice Responsibility (TERCAP™) audit instrument⁶ (Appendix 2). The modified instrument contained 11 sections: General Incident Description, Patient Profile, Licensee Profile, Setting Profile, Patient Outcomes⁷, Categories of Nursing Errors (identified as Practice Breakdown in the original TERCAP instrument), Health Care Team, Nursing Outcomes (Board and Employer Actions), Primary Cause of Nursing Error, Standard of Conduct Violations, and Complainant Type. The instrument's content validity was determined to be acceptable following a review by a senior Board staff member, a masters-prepared RN with 29 years of nursing experience in clinical practice, nursing education and regulation. Data came from the Commonwealth's nurse licensee database, the Board's 2004-2006 Complaint Disposition Logs⁸, the Division of Health

⁶ National Council of State Boards of Nursing. (2005). *Taxonomy of Error, Root Cause Analysis and Practice Responsibility* (Version 02182005). Chicago, IL: Author. The Board gratefully acknowledges permission from the NCSBN to use the TERCAP audit instrument for this study.

⁷ Adapted from the Massachusetts Board of Registration in Pharmacy's Categories of Events; used in lieu of the TERCAP Patient Harm Index. Source: Massachusetts Board of Registration in Pharmacy. (2005). Report on Analysis of Quality Related Event (Medication Error) Reports Reviewed by the Massachusetts Board of Registration in Pharmacy January 1, 2004 – December 1, 2004. Boston, MA: Author.

⁸ Massachusetts Board of Registration in Nursing. 2004-2006 Complaint Disposition Log. Boston, MA: Author (unpublished report).

4. Results

The study data is organized into the following subsections:

- A. Nurse Characteristics
- B. Patient Characteristics
- C. Setting Characteristics
- D. Time of Day, Month and Year in Which Nursing Error Occurred
- E. Nurse's Perception of Factors Associated with the Nursing Error
- F. Categories of Nursing Errors – with a focus on the nurse related-factors and practice related factors for two of the most common error categories identified in the study: Errors in Medication Administration and Clinical Judgment
- G. Categories of Harm Associated with Nursing Errors
- H. Employer and Board Actions in Response to Nursing Errors

A. Nurse Characteristics

The average age of the nurses (RNs and LPNs) in the sample was 44 years (median: 43 years; range: 24 to 69 years) at the time the error occurred (Table 2 below). The nurses were primarily female (91%) and most (90%) were involved in a single incident error. The nurses' primary language was not collected.

Table 2: Age of nurse at time of nursing error

	LPN (n = 44)	RN (n = 34)	Total (N = 78)
Average age @ time of nursing error	42 years	48 years	44 years
Median age @ time of nursing error	43 years	48.5 years	45 years
Age range	24 - 63 years	25 - 69 years	24 - 69 years

RNs were licensed an average of 15 years (median: 9.75 years; range: 1.5 to 48 years) at the time the error occurred. Forty-one of the 44 (93%) LPNs were known to be licensed an average of 11 years (median: 8 years; range: 1 month to 44 years); the length of nurse licensure was unknown for three LPNs. Seven (16%) of the 44 LPNs were known to be licensed for one year or less which was defined as a "novice" for this study. None of the 34 RNs included in this study were novices.

⁹ Massachusetts Department of Public Health. (November 10, 2005). *Division of Health Care Quality Facilities Report by Facility Type*. Boston, MA: Author (unpublished report).

¹⁰ Massachusetts Department of Public Health. (November 10, 2005). *Division of Health Care Quality Hospital Beds/Unit Report*. Boston, MA: Author (unpublished report).

¹¹ The complaint case file contains a variety of documents used by the Board in its evaluation of a complaint such as the investigation summary completed by the Board's Nurse Investigator along with copies of the following DHCQ forms completed by the facility if applicable, where the nursing error occurred: *Surveyor Investigation Report*, *Incident Report Form*; and *Corrective Action Plan*. The complaint case file may also contain the nurse's written response to the complaint, resume and performance evaluations, and medical records including but not limited to, patient progress notes, medication administration records (MAR), facility time sheets, incidence reports, and documentation of the Board's determination and action on the complaint including, if applicable, the Consent Agreement between the nurse and the Board or Board order.

Seventy-three (94%) of the 78 nurses received their basic nursing education in the United States. One LPN was educated in Liberia while the country of basic nursing education was not known for the remaining four nurses. Twenty-two (65%) of the 34 RNs received their basic nursing education at the Associate Degree level. Other RNs received their basic nursing education as follows: seven (21%) at the hospital-based diploma level and three (8%) at the baccalaureate degree level (basic nursing education level could not be determined for 2 RNs). Further nursing education was not collected.

Job tenure at the time of the error was known for 63 of the 78 nurses. Of the 63 RNs and LPNs for whom job tenure at the time of the error was known, the average was 3.6 years (median: 1.75 years; range: 1 week to 24 years) (Table 3 below)

Table 3: Nurse's job tenure at time of nursing error

Nurse	Job tenure: Average # years	Job tenure: Median # years	Range	# for whom job tenure is known	# for whom job tenure is unknown
LPN	2.8 years	1 year	1 week – 17 years	32	12
RN	4.7 years	3 years	2 weeks – 24 years	31	3
Total	3.6 years	1.75 years	1 week – 24 years	63	15

Seventy (90%) of the 78 RNs and LPNs practiced in a direct patient care role and had no supervisor responsibilities (Table 4 below).

Table 4: Primary role of nurse at time of nursing error

Nurse	Direct care	Supervisor	Direct care & supervisory	# for whom primary role is known	# for whom primary role is unknown
LPN	41	1	0	42	2
RN	29	2	1	32	2
Total	70	3	1	74	4

Twenty-one (27%) of the 78 nurses were known to work in a temporary capacity (e.g. covering another nurse's assignment, float, employed by temporary staffing agency). Seventeen (22%) of the 78 nurses were employed by temporary staffing agencies and were on a short-term assignment in the nursing home at the time of the error (one of the 17 nurses employed by a temporary staffing agency was a novice LPN) (Table 5 below).

Table 5: Nurses working in temporary capacity at the time of nursing error

Nurse	# covering another nurse's assignment	# assigned to float to another unit	# float from float pool	# employed by temporary staffing agency (Short-term assignment)	# employed as "travel nurse" (Long-term assignment)	Total # working in temporary capacity	# for whom work capacity (temporary vs permanent) is known	# for whom work capacity (temporary vs permanent) is unknown
LPN	0	0	1	9	1	11	44	0
RN	0	2	0	8	0	10	33	1
Total	0	2	1	17	1	21	77	1

Work start and end times were identifiable for 45 (58%) of the 78 nurses, the majority of whom worked 3 p.m. to 11 p.m. (Table 6 below). Little information was available regarding the number of patients and staff the nurse oversaw.

Table 6: Work start and end time (ranked by total)

Nurse	3 pm - 11 pm start/end time	7 am - 3 pm start/end time	11 pm - 7 am start/end time	Other time frames	# for whom start/end time is known	# for whom start/end time is unknown
LPN	10	6	5	5	26	18
RN	9	5	4	1	19	15
Total	19	11	9	6	45	33

Only one of the 78 nurses in this study had been disciplined previously for deficiencies in clinical knowledge, judgment and critical thinking. The remaining 77 nurses had no prior Board discipline.

B. Patient Characteristics

The nursing errors identified in this study occurred in the provision of care to 62 patients¹². The patients were primarily female (73% female; 24% male; and 3% gender unknown). Of the 51 patients whose age was known, the average was 79 years (median: 81 years; range: 45 – 96 years) at the time the error occurred. Of the 46 patients for whom a diagnosis was known, the most frequently identified diagnoses were dementia (11) followed by diabetes (7). The patients' primary language was not known.

C. Setting Characteristics

Nurses in this study were employed by, or assigned on a temporary basis to, 50 different nursing home facilities located in Massachusetts. The facility bed size averaged 131 (median: 125 beds; range: 63 to 333 beds). Although there was no specific indication in the case file regarding the type of medical records used by each facility (i.e., electronic or paper nurse's

¹² An additional 20 patients were involved in a medication administration error by a nurse when they received an incorrect dose (0.5 cc ordered, 1.0 cc administered) of flu vaccine. Information regarding these patients is not known.

notes, physician orders or medication administration record), it appeared that the majority of the medication administration records (MARs) were generated electronically while the nurse's notes were hand-written.

D. Time of Day, Month and Year in Which Nursing Errors Occurred

The time of day in which the nursing error occurred varied widely. Of the 73 nursing errors in which the time of day was known, most errors occurred between 5:00 p.m. and 6:30 p.m. followed by the period between 5:00 a.m. and 6:30 a.m.

While there was variability in the occurrence of errors by month, most errors occurred during the month of October (11) followed by the months of May (9) and December (8). The year in which the errors in this study occurred ranged between 1996 and 2004 with over half (43) occurring in 2004 followed by 2003 (22) and 2005 (6).

E. Nurse's Perception of Factors Associated with Nursing Errors

This section describes the nurse's perception of the factors associated with the nursing error, as reported by the nurse to the Board in the nurse's written response to the complaint. Data was collected using the modified TERCAP audit instrument.

While 60 (77%) of the 78 RNs and LPNs in this study provided a written explanation, the depth and breadth of the nurse's assessment of the events surrounding the error varied widely.

Among the 60 nurses, the nurse-identified factors (one or more factors may be identified) were:

- stress/high work volume (e.g. caring for 40 patients with 2 certified nursing assistants) (13);
- inexperience with the clinical event, procedure or condition (11);
- the nurse's practice in an unfamiliar setting (9);
- poor judgment (6);
- change-of-shift communication (5) ¹³;
- frequent interruptions during medication administration (4);
- inappropriate assumptions (4) ¹⁴;
- lack of team support (3);
- distraction (1);
- patient was not wearing a resuscitation directive wrist band (1);
- conflict (1);

¹³ In one case, for example, a nurse who administered medications to the wrong patient because she had failed to verify the patient's identity explained that she was not informed that the patient had been moved to another room. In another example, three nurses reported that a patient's blood clotting test was not reported to them during change-of-shift report to prompt them to question the ongoing administration of a patient's anticoagulant drug.

¹⁴ In one case, for example, the nurse explained that she had noted a patient's allergy to an ordered medication and that the patient had received the medication on an earlier shift with no ill effect. The nurse *assumed* that the question of the patient's allergies had been addressed by the patient's physician and the nurse who obtained the medication order from the physician. However, the nurse who obtained the medication order never checked the patient's allergies and the physician had *assumed* the patient had no medication allergies since the nurse obtaining the order did not mention any. The patient ultimately received three doses of the medication before being transferred to the hospital in respiratory distress where the patient later died. A report in the complaint case indicated that the Medical Examiner concluded that the patient's death was "probably not due" to the patient receiving the medication. In a second case, a nurse with no previous experience caring for patients in cardiopulmonary arrest stated she had *assumed* a patient admitted two days earlier had a "Do Not Resuscitate" order. However, the patient's resuscitation directive required emergency measures in the event of a cardiopulmonary arrest including the initiation of cardiopulmonary resuscitation (CPR). When the patient was found to be unresponsive and without a pulse or respirations, the nurse failed to initiate CPR.

- failed to check patient's identification bracelet (1);
- mental health issues (1); and
- fatigue/lack of sleep (1).

Interestingly, five of the 11 nurses who identified inexperience with a clinical event, procedure or condition as a contributing factor in their nursing error were *novice* LPNs involved in medication administration errors that included the administration of:

- the wrong doses of narcotics (3);
- a narcotic by the wrong route (1); and
- antipsychotic agents and narcotics at the wrong time.

The remaining six nurses in this subgroup of 11 were *experienced* nurses who were found to have:

- incorrectly intervened on behalf of a patient (3);
- demonstrated inappropriate clinical judgment (2); and
- incorrectly administered a medication (1).

Seventeen of the 78 nurses were employed by temporary staffing agencies. Thirteen of these 17 nurses cited the following factors as contributing to their nursing errors:

- unfamiliar practice setting (6);
- stress/high work volume (5);
- lack of experience with the clinical event, procedure or condition (1); and
- lack of team support (1).

The remaining four nurses in this subgroup did not provide the Board with a written explanation for their nursing error.

F. Categories of Nursing Errors

The following section describes the categories of nursing errors identified in this study as determined using the modified TERCAP audit instrument. These include eight possible nurse-based error categories: lack of attentiveness or surveillance, faulty intervention, lack of professional responsibility or patient advocacy, inappropriate clinical judgment, missed or mistaken orders, lack of prevention, documentation errors and medication administration errors (a detailed description of each error category is presented in Appendix 3). To identify the category of nursing error in each complaint case, the following were considered in reviewing the available complaint file documentation: whether the error would have occurred if this factor was not present; whether the error would have recurred if this factor was not corrected or eliminated; and how this category of practice error would best be described.

Overall, this study identified errors in seven of the eight TERCAP categories. The frequency of each error category appears in Table 7 below. A detailed discussion of the two categories of errors occurring most frequently - medication administration (42) and clinical judgment errors (17) - is presented in the following four subsections. The four subsections address both the individual nurse and practice environment-related¹⁵ factors associated with each of these two nursing errors.

¹⁵ Practice environment-related factors include the health care team, team function, policies, equipment, environmental factors, leadership and management, communication, and back-up and support factors).

Table 7: Frequency of TERCAP categories of nursing errors in sample (ranked by total)

Nurse	Medication errors	Inappropriate clinical judgment	Lack professional responsibility or patient advocacy	Lack of attentiveness or surveillance	Faulty intervention	Lack of prevention	Missed or mistaken order	Documentation errors
LPNs (n=44)	23	11	3	2	2	2	1	0
RNs (n=34)	19	6	3	3	2	1	0	0
Total (N=78)	42	17	6	5	4	3	1	0

1. Medication Administration Errors: Nurse-related Factors

Medication administration errors were the most common category of nursing error identified in this study. The 42 nurses involved in medication administration errors had been licensed for an average of 11 years (median: 8 years). The majority of these nurses had been employed in their then current position for an average of 2 years (median: 1 year; range: 2 weeks to 11 years) when the practice error occurred. Overall, 26 of the 42 nurses attributed the following factors to their medication administration error including practice in an unfamiliar setting (8), stress/high work volume (8), lack of experience with clinical event, procedure or condition (6), lack of team support (2), fatigue/lack of sleep (1) and mental health issues (1).

On review of the complaint case file, more than one contributing factor was found to be associated with most of the medication administration errors in this study; the majority (74%) was associated with the nurse's failure to adhere to one or more of the "five rights"¹⁶ and "three checks"¹⁷ of medication administration (Table 8 below). The most common violation of the five rights was the administration of a medication to the wrong patient which occurred because the nurse failed to verify the patient's identification before administering the medication. One example of this occurred when a nurse failed to check the patient's identification bracelet before administering Digoxin¹⁸ to a confused patient. As a result, the patient who had already received a dose of Digoxin received a second dose which had been prescribed for another patient.

¹⁶ The nurse administers the right dose of the right medication via the right route to the right patient at the right time.

¹⁷ The medication container label is first read when the nurse reaches for the medication container; it is then read a second time immediately before pouring or opening the medication container; and it is then read a third time when the nurse replaces the container or before giving the dose to the patient.

¹⁸ Digoxin is a medication that causes the heart to beat more slowly and efficiently. *Source: Nursing 2005 Drug Handbook*. (2005). Philadelphia, PA: Lippincott Williams & Wilkins.

Table 8: Five right violations associated with medication administration errors

Violation	LPN	RN	Total LPNs and RNs	% All Med Errors (N =42)
Wrong patient	4	7	11	26%
Wrong drug	5	4	9	21%
Wrong dose	7	0	7	17%
Wrong time	2	1	3	7%
Wrong route	1	0	1	2%
Total	19	12	31	74%

A summary of the medication administration errors involving violations of the five rights and three checks is contained in Appendices 4A – 4E.

Other nurse-related factors associated with medication administration errors included:

- the incorrect transcription of medication orders (10);
- the nurse's failure to verify whether the patient had a drug allergy when obtaining a medication order or prior to administering a medication (7); and
- the nurse's lack of knowledge about a medication's desired actions or potential risks (4).

An example of a medication administration error caused by an incorrectly transcribed order and the nurse's lack of knowledge about the desired action of the prescribed medication involved a nurse who appropriately verified an order by telephone with the patient's physician and then, in transcribing the medication orders, incorrectly wrote "Folex" (an antineoplastic and immunosuppressant agent) instead of the prescribed "Foltx" (Vitamin B, prescribed in this case for cardiac stability). The patient subsequently received 37 doses of the Folex over a period of 19 days with no apparent ill effects.

Another example of a medication administration error caused by an incorrect transcription involved a nurse who, to assist the oncoming nurse, transcribed orders from the transfer summary of a newly admitted patient to the MAR without verifying the orders with the patient's physician. The nurse *assumed* that this would be done by the oncoming nurse. However, the oncoming nurse did not, assuming the verification had already been performed. The correct order was: Lovenox¹⁹ every 12 hours until the patient's blood clotting test was between 2 and 3 then discontinue the Lovenox. The order was incorrectly transcribed to read: Lovenox every 12 hours to maintain the patient's blood clotting test between 2 and 3. As a result, the patient received an overdose of an anticoagulant medication that required treatment.

2. Medication Administration Errors: Practice Environment-related Factors

In the 42 cases involving a medication administration error, other health care team members were involved in the patient's care including non-supervisory LPNs (14) and RNs (13), physicians (9), and pharmacists (8). The evaluation of these errors did not indicate that any of the following were contributing factors associated with the nursing error: unit level conflict, a non-supportive practice environment, the inability to work as a team, intimidating or threatening behavior, or the team's lack of awareness of the patient as a whole.

¹⁹ Lovenox is an anticoagulant medication. Source: *Nursing 2005 Drug Handbook*. (2005). Philadelphia, PA: Lippincott Williams & Wilkins.

Frequent interruptions during medication preparation and administration were found in 10 of the 42 medication administration errors. The reason for the interruptions was not always clear. For example, after drawing up a dose of Insulin at 4:30 p.m., a nurse, distracted by a patient climbing out of bed, left the medication cart to redirect and assist the patient. When the nurse returned to the medication cart, she reportedly became “confused” and administered the Insulin to the wrong patient. It was unclear whether there were other staff available that the nurse could have enlisted to assist the patient who was climbing out of bed rather than to leave the medication cart at the point the nurse did (e.g., given the time of the error, available staff may have been preparing other patients for dinner).

Other practice environment-related factors that were found to be associated with the medication administration errors in this study sample included:

- the absence of patient identification such as facility-issued bracelets or photographs (2);
- lack of consistent preceptor or short length of time for novice nurse orientation (2)
- the availability of Amoxicillin as an emergency stock drug²⁰ (2);
- drug name confusion (1);
- illegible physician writing (1);
- increased noise level (1);
- failure to perform end-of-shift narcotics count correctly (1);
- lack of a drug reference available for consultation (1);
- drug label confusion (1); and
- a defective dropper on which the nurse was only able to identify the 1cc level (1)²¹.

A lack of sufficient support for novice nurses was identified as a potential practice environment factor. For example, a nurse who had been licensed for one month reported she felt “overwhelmed” during medication passes because of multiple interruptions by patients and staff. During her orientation to the unit, the nurse “worked with three different nurses on three different days” after which she worked alone and was encouraged to ask questions of other nurses as needed (it was unclear whether the novice nurse would recognize what questions would need to be asked of the more experienced nurses). This nurse indicated she had been assigned to the facility’s sub-acute unit because she had previous experience as a nursing assistant in a hospital critical care unit. Similarly, another nurse, licensed for six months, reported “still feeling uncomfortable” when working alone after the end of the facility’s 15-day orientation period.

Nursing management at several facilities indicated that policies and procedures were revised as a result of their facilities’ investigation into the cause of the medication administration errors. As a result of one medication administration error, for example, the facility implemented a policy requiring any nurse employed by a temporary staffing agency to verify any Insulin dose with a nurse employed by the facility. In another example, a facility implemented a new policy requiring two nurses to verify the accuracy of liquid narcotic dosages. This facility also instituted a new policy requiring nurses new to the facility to have liquid narcotics, Insulin, Coumadin and intravenous drip rates verified by a second nurse for the first 90 days of their employment. In

²⁰ In one case, for example, a nurse who failed to check for drug allergies removed the Amoxicillin from the emergency stock for use until the order was filled by the pharmacy the following morning; the pharmacy subsequently flagged the order because the patient was known to be allergic to this antibiotic.

²¹ In this case, the nurse appropriately checked the MAR for the order which required a sublingual morphine sulfate dose of 0.125 cc; the nurse however interpreted the dose to be 1.25 cc in light of the markings on the syringe.

yet another example, a new policy required nurses receiving telephone orders to read back to the prescriber both the order *and* the patient's allergies.

3. Clinical Judgment Errors: Nurse-related Factors

Critical thinking, appropriate decision making and sound clinical judgment are central to the nurse's ability to respond safely and effectively to changes in a patient's clinical condition. The nurse's inappropriate clinical judgment was identified as the second most common category of error in this study and was associated with the most sentinel events (i.e. the nursing error was associated with serious permanent patient harm or death).

Many of the seventeen clinical judgment errors identified in this study were found to be associated with more than one contributing factor including the nurse's:

- failure to recognize, or to correctly interpret, the implications of the patient's signs and symptoms or the implications of the nurse's interventions (12);
- knowledge deficit (9);
- failure to notify the patient's physician of a change in patient condition (7);
- ineffective monitoring of the patient's clinical status (3); and
- poor judgment in delegating or supervising other staff (1).

Several examples of this category of multiple-causal errors in clinical judgment were associated with temporary patient harm or sentinel events. Among these examples are three cases in which each of the nurses applied a heat treatment without a valid medical order, and failed to assess and monitor the patient's vital signs and skin integrity before, during and after applying the heat treatment. In all three cases, the heat treatment remained in place for extended durations; each of the patients sustained second degree burns that required treatment. The three nurses had been licensed for an average of 22 years (range: 7.5 to 48 years) and had held the same position for an average of 10 years (range: 5 to 19.5 years).

In another example, a nurse who had been licensed for 18 years and had held the same position for four years at the time of the error failed to take appropriate action or demonstrate knowledge and competence in caring for a patient whose gastrostomy tube²² had fallen out. The nurse improperly replaced the tube and continued feeding the patient through the replaced tube. The nurse did not notify the physician in a timely manner that the tube had fallen out and had been replaced, nor did the nurse recognize the significance of subsequent changes in the patient's clinical condition. The patient later died as a result of acute peritonitis from the infusion of tube feeding into the peritoneal cavity instead of the patient's stomach.

Another example involved a nurse with 21 months of experience who assessed a patient with a diagnosis of "failure to thrive" at 5:00 p.m. and found that the patient had a temperature of 106.1²³ degrees and a respiratory rate of 36 breaths per minute²⁴, both significant changes in the patient's condition. The nurse did not demonstrate knowledge of the significance of this patient's clinical status when the nurse failed to respond appropriately and in a timely manner, and did not notify the patient's nurse practitioner until 7:30 p.m. of the changes in the patient's

²² A gastrostomy tube is inserted through a surgical incision into the stomach providing another route for the administration of nutrition and medications. *Source*: Kozier, B., Erb, G., Berman, A. and Snyder, S. (2004). *Fundamentals of Nursing: Concepts, Process, and Practice*. (7th ed., p. 811). Upper Saddle River, NJ: Pearson Education Inc.

²³ Normal temperature is 97.0 to 98.6 degrees. *Source*: Ibid., p. 488.

²⁴ Normal respiratory rate is 15 to 20 breaths per minute. *Source*: Ibid., p. 485.

condition or that the patient's family had requested that the patient be transferred to the hospital. The patient in this case also died.

A fourth example involved a nurse who, despite the patient having an oxygen saturation value between 50% and 60%²⁵, misinterpreted a patient's lethargy, sleepiness, weakness and difficulty waking as the result of the patient receiving a new sedative medication the previous night. The nurse who had been licensed for 6.5 years and who held the same position for three years at the time of the incident administered oxygen via a face mask causing the oxygen saturation to return to 85%-87%. However, the plan of care for this patient who had chronic obstructive pulmonary disease specified that oxygen was to be administered via a nasal cannula in light of the patient's potential for carbon dioxide retention. The patient died during the next shift.

In a fifth example, a nurse failed to appropriately assess a patient or recognize the implications of the patient's clinical status when informed by a nursing assistant that the patient had had an episode of rectal bleeding, and was found to be pale and lethargic. In addition, the patient's hematocrit and hemoglobin were abnormal as reported to the nurse by the laboratory earlier in the shift. The nurse did not notify the patient's physician of the patient's clinical status or the abnormal blood work. The nurse informed the oncoming nurse at the change-of-shift report that the blood tests had been left in the nurse manager's office, making no mention of the abnormal hematocrit and hemoglobin or that the patient had experienced rectal bleeding. The patient complained of chest pain later in the next shift and was transferred to the emergency room where the patient died. At the time of the error, the nurse involved in this case had been licensed for seven years and held the same position for two years.

A final example involved two nurses caring for a terminally ill patient who was admitted for short-term care while receiving chemotherapy and who had verbalized that he wished to have aggressive treatment for his condition; his plan was to return to his home. Over a four-day period, the patient's medical condition significantly declined. During this time, the nurses failed to assess or effectively monitor the patient's vital signs or fluid intake and output despite the patient's blood test indicating the patient was dehydrated. The nurses also failed to notify the patient's physician of the abnormal blood tests or changes in condition. The patient later died on the fourth day after admission. Both nurses in this case had been licensed for an average of 16 years (range: 14 to 17.5 years); it was not clear from the case file how long each had been on the facility's staff.

4. Clinical Judgment Errors: Practice Environment-related Factors

The health care team members in the 17 clinical judgment errors varied in comparison to those members involved in the medication administration errors. In addition to the non-supervisory LPNs (10) and RNs (2), the other team members identified as associated with the clinical judgment errors also included nursing supervisors (9), unlicensed assistive personnel (4); and non-supervisory nurse practitioners (3). No physicians or pharmacists were identified as associated with this type of nursing error.

The health care team's lack of awareness of the patient's goals was identified in four of the 17 clinical judgment errors. For example, a patient's resuscitation directive was unknown by staff

²⁵ Normal oxygen saturation value is 95% to 100%; below 70% is life threatening. Source: Ibid., p. 517.
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without looking in the patient's record. Other practice environment-related factors identified as associated with the clinical judgment errors were:

- information missing from patient records (4);
- a breakdown in unit level communication including hand-offs at change-of-shift (3);
- a lack of, or poor, supervisory support (2);
- the absence of a facility policy (e.g., gastrostomy tube reinsertion) (1);
- a lack of experienced staff (1);
- resuscitation status unknown without consulting patient's medical record located at nurse's station (1); and
- frequent interruptions (1).

Based on a review of the case file, the clinical judgment errors were not attributed to unit level conflict, the inability to work as a team, intimidating or threatening behavior, or the lack of back-up systems (e.g., ineffective medical or laboratory coverage). Also, none of the 17 nurses involved in the clinical judgment errors were novice nurses. Therefore, a facility's support of novice nurses was not identified as an issue as it had been in the medication administration errors.

G. Categories of Harm Associated with Nursing Errors

The following section provides a general overview of the harm outcome (both harm and harm-potential) as a result of the 78 nursing errors. Based on the TERCAP audit instrument, it also specifically addresses sentinel events including the associated nursing error categories, and the individual nurse and practice environment factors. For the purpose of this study, it is important to note that the nursing errors that were categorized as associated with sentinel events were not necessarily the direct cause of the serious, permanent harm or death to the patient. The patient harm categories were adapted from the *Report on Study of Quality Related Event (Medication administration error) Reports January 1, 2004, to December 31, 2004*, Massachusetts Board of Registration in Pharmacy.

1. Overview of Harm and Harm Potential Associated with All Nursing Errors

Overall, 46 of the 78 nursing errors were associated with harm to 37 patients. No patient harm was associated with 29 of the 78 nursing errors although the error did reach the patient (e.g. the administration of the wrong medication to a patient with no apparent ill effect). In three of the 78 nursing errors the error was identified before it reached the patient and potential harm was averted. Table 9 summarizes the patient harm outcome for the 78 nursing errors. No nursing errors were associated with harm to the nurse or other members of the health care team.

Table 9: Categories of patient harm

Categories of Patient Harm	LPN (n=44)	RN (n=34)	Total (N=78)	% of N
Harm: serious permanent or death (sentinel event)	6	6	12	15%
Harm: temporary (error reached patient and temporary harm resulted)	20	14	34	44%
Harm: no harm (error reached patient and no harm resulted)	16	13	29	37%
Harm: potential (error occurred but did not reach patient)	2	1	3	4%

2. Nursing Errors Categories Associated with Sentinel Events

Using the modified TERCAP audit instrument, the following nursing error categories were identified as associated with the 12 sentinel events: inappropriate clinical judgment (7); lack of professional responsibility or patient advocacy (3); faulty intervention (1); and medication administration error (i.e. the administration of the wrong narcotic dose) (1). Among the two most common nursing error categories, 21 of the 42 medication administration errors were associated with harm to 15 patients including 1 death while the clinical judgment errors were associated with harm to 12 patients including 6 deaths.

Of particular note, six (50%) of the 12 sentinel events involved cardiopulmonary resuscitation. The nursing errors in the six CPR-related sentinel events were categorized as: lack of professional responsibility or patient advocacy (3); inappropriate clinical judgment (2); and faulty intervention (1). In each of the three cases associated with the nurse's lack of professional responsibility or patient advocacy, the patient's resuscitation directive required the initiation of CPR. Although the nurses' decisions were influenced by clinical reasoning, the nurses chose not to perform CPR once they were aware of the patient's wish to be resuscitated²⁶.

3. Sentinel Events: Nurse-related Factors

Eight of the 12 nurses involved in the sentinel events provided a written explanation to the Board. In their explanation, the nurses associated one or more contributing factors with the error: stress and a high volume of work (3); inexperience with the clinical activity (2); poor judgment (2); lack of team support (1); and the facility's failure to provide the patient with a wrist band indicating the patient's resuscitation directive (1).

On review of the case file, multiple other nurse-related factors were found to be associated with the 12 sentinel events including the nurse's failure to recognize, or to correctly interpret, the implications of the patient's signs and symptoms or the implications of the nurse's interventions (8); a nurse's failure to notify the patient's health care provider of a change in patient condition (7); specific patient requests unattended (6); lack of timely or skillful intervention (6); lack of follow-up (3); lack of intervention tailored to patient needs (3); delay in treatment (3); inappropriate intervention (3); knowledge deficit (2); poor judgment (2); and ineffective monitoring of the patient's clinical status (2).

4. Sentinel Events: Practice Environment-related Factors

Members of the health care team who were also involved in the 12 sentinel events included non-supervisory LPNs (9) and RNs (3), nurse supervisors (4), health care prescribers (2), unlicensed assistive personnel (2), and a non-supervisory APRN. None of the 12 sentinel events involved novice nurses or those employed by temporary staffing agencies.

Other practice environment-related factors identified in this study as associated with the sentinel events included: lack of awareness of the patient's goals (4); unit level communication breakdown including hand-offs at change-of-shift (2); absence of patient identification bracelets indicating the patient's resuscitation directive (2); resuscitation equipment located in locked closet off a hallway (1); resuscitation status unknown without consulting patient's medical record

²⁶ For example, a nurse who failed to perform CPR despite the patient's resuscitation directive to do so reported she made a clinical decision not to resuscitate the patient because the patient was frail and she felt that chest compressions would have broken the patient's ribs.

located at nurse's station (1); poor supervisory support (1); and the absence of related facility policy (1).

H. Employer and Board Actions In Response To Nursing Errors

The following subsections describe the nurse employer's actions in response to the nursing errors included in this study. It also addresses the Board's actions in response to the cases in the sample and specifically addresses errors in medication administration and clinical judgment as well as those involving sentinel events. The employer and Board responses are described using the modified TERCAP audit instrument.

1. Employer Actions in Response to All Nursing Errors

The most common action by employers in response to a nursing error in this study, regardless of error category, was to require the nurse to complete some form of remedial education program (38 of 78). Other responses included *one or more* of the following actions:

- "inservicing " or counseling the nurse regarding the facility's policies and procedures that addressed the nursing error (15);
- terminating the nurse's employment after the nurse failed to demonstrate improved competency following the error or because the nurse had previously made an error (9);
- reassigning the nurse (9);
- suspending the nurse's employment (9);
- requiring the nurse to successfully complete a medication test (3) or one or more supervised medication passes (8);
- issuing an oral or written warning to the nurse (6);
- reporting the error to the Board (2); or
- placing the nurse's employment on probation (2).

2. Board Actions in Response to All Nursing Errors

The distribution of Board actions for each of the seven nursing error categories in this study is provided in Appendix 5. The Board dismissed 51 of the 78 complaint cases finding that remedial action was not warranted. As noted earlier in Section II.B., the Board's determinations that Board-imposed remediation in any form was not warranted were based on its consideration of substantiating evidence regarding: the nature and related circumstances of the nurse's conduct, applicable remedial activities successfully completed by the nurse, performance evaluations of the nurse prior to and following the error, any acknowledgement by the nurse of the practice error and its significance, prior repeated or continuing practice related problems, associated system or practice environment-related factors (e.g. policies, equipment, communication) and the need for an official record of the nurse's practice related error.

The Board imposed remedial requirements in 27 of the 78 complaint cases including 16 reprimands and 11 probations. The nurses placed on probation were required to complete remedial clinical education, practice under the supervision of an on-site RN, and have performance evaluations submitted to the Board by their employer at specified intervals. These nurses were also prohibited from practicing in a home care setting since on-site supervision would not be available. In none of the 78 complaint cases did the Board suspend or revoke a nurse's license.

3. Board Actions in Response to Medication Administration Errors

Of the 42 complaint cases involving a medication administration error, the Board dismissed 34 complaint cases based on its conclusion that discipline (i.e., imposed remediation) was not warranted upon consideration of the factors identified above. It issued reprimands in six of the cases and placed the nurses in two of the cases on probation. Of the two nurses placed on probation, one had *assumed* that another nurse had checked the patient's drug allergies when accepting an order for ampicillin²⁷. This nurse also demonstrated a lack of knowledge about the medications she was to administer when she was not aware that a new order written for "Cipro"²⁸ was in the same drug classification as norfloxacin to which the patient was allergic. The second nurse placed on probation was found to have administered the wrong medications to a patient including a narcotic overdose; had falsely documented administering the medications as scheduled; and had not identified the patient prior to administering the medications. The Board also found that this nurse did not appropriately assess the patient or take other appropriate actions when informed of the changes in the patient's condition.

4. Board Actions in Response to Clinical Judgment Errors

In four of the 17 cases involving clinical judgment errors, the Board dismissed the complaints after considering the existing circumstances and concluding that Board-imposed discipline (remediation) was not warranted. In eight of the 17 cases, the nurses were placed on probation by the Board to promote and confirm the nurse's return to safe, competent practice. In each such case, the nursing error was associated with patient harm or death and the nurse was required to complete remedial education, practice under the supervision of an on-site RN, and demonstrate ongoing safe and competent practice through the submission of employment evaluations. An example of a clinical judgment error that resulted in the nurse's probation involved the nurse who cared for the patient who had both a temperature of 106.1 degrees and a respiratory rate of 36 breaths per minute. The Board found that the nurse demonstrated a lack of knowledge and competence when she did not recognize the significance or implications of this patient's signs and symptoms, as well as her failure to notify the patient's nurse practitioner of changes in the patient's condition in a timely manner.

In five of the 17 clinical judgment error cases, the Board issued reprimands to each of the nurses concluding that remedial action was needed in the form of an official acknowledgment of the error. One example of such a case involved a nurse who did not respond appropriately or in a timely manner to information from a patient's family member that the patient was experiencing chest tightness or pain, or both.

5. Board Actions in Response to Sentinel Events

In five of the 12 complaint cases that were associated with a sentinel event, the Board placed the nurses on probation in order to confirm the nurses' return to safe, competent practice. An example of a nursing error associated with a sentinel event in which the Board placed the nurse on probation involved the nurse who did not adhere to a terminally ill patient's medical plan of care and did not take appropriate actions in response to changes in the patient's clinical condition.

²⁷ Ampicillin is an antibiotic medication (penicillin class). Source: Aschenbrenner, D., and Venable, S. (2006). *Drug Therapy in Nursing* (2nd ed., p. 677). Philadelphia, PA: Lippincott, Williams & Wilkins.

²⁸ Cipro is an antibiotic medication (fluoroquinolone class). Source: Ibid, p. 724.

The Board issued reprimands in six of the remaining seven cases. An example of such a case involved the nurse who did not appropriately monitor, assess, document and communicate a terminally ill patient's condition.

The Board dismissed one complaint case associated with a sentinel event following its determination that Board-imposed remediation in any form was not warranted based on its consideration of substantiating evidence. This case involved a nurse with three years of experience who did not respond appropriately when, after dialing "911" for assistance with an unresponsive patient, the nurse went to the facility door rather than assign a nursing assistant to wait for the emergency medical technicians.

5. Study Limitations

The small sample size and the case study design of this study limit the ability to generalize the findings to all nurses. The underreporting of errors has been associated in the literature with a nurse's failure to recognize that an error had occurred; fear of punitive action by employers or the Board; or fear of being identified as someone who made had an error.

Differences among state and federal error reporting requirements and practices for health care settings result in differences in the number and type of complaints received by the Board from acute care hospitals and nursing homes. Consequently, a higher number of complaints are received by the Board involve practice in nursing homes than in acute care hospitals. Since the sample for this study was drawn from these complaints, any conclusions regarding the incidence of nursing errors in any particular health care setting or by type of nurse licensure or basic nursing education would also not be valid.

Another limitation is that the complaint file is not specifically designed as a tool for the root cause analysis of a nursing error. As a result, the study does not account for all of the nurse and environment-related variables that could potentially contribute to nursing errors. For example, the breadth and depth of error "epidemiology" varied among employers who reported errors to the DHCQ and the Board. Also, the depth of the nurse's written response to the Board about their particular nursing error revealed helpful insight in some complaint cases and little information in others. In addition, some case files did not include particular documents such as the nurse's resume or narrative response nor did the documents consistently provide information about the nurse's shift type, number of patients or staff overseen by the nurse, whether the nurse was working overtime or the number of days in a row the nurse had worked when the error occurred.

6. Discussion

This study describes the incidence and nature of nursing errors among 78 nurses (34 RNs and 44 LPNs) practicing in 50 nursing homes located in Massachusetts. The study sample is very small and does not reflect the proportion of all RNs (106,165) and LPNs (19,622) who held current Massachusetts nurse licensure as of December 31, 2005. The study sample also does not reflect the proportion of RNs (442) and LPNs (239) whose complaint case was evaluated and closed by the Board during CY 2005.

A. Orientation and Novice Nurse Transition Programs

The study sample included seven novice LPNs and no novice RNs. This finding is similar to national data indicating novice LPNs work most frequently in nursing homes (44%) and medical/surgical (30%) settings while novice RNs work most frequently in medical/surgical (40%) and critical care (31%); in fact, nursing homes are identified as the employment setting of only 11% of all novice RNs in the United States²⁹.

The seven novice LPNs in this study, each of whom had been involved in a medication administration error, were licensed an average of six months when their nursing error occurred. They reported they felt overwhelmed and uncomfortable when administering medications despite completing a facility orientation. In addition, this subgroup of nurses attributed their medication administration error to their lack of experience since, for many, it was the first time they had encountered the particular drug therapy situation in which the error occurred (e.g., a new medication, dosage, or route; need to calculate drug dosage). The Board also found that interruptions by other staff and patients during the medication administration process challenged the novice's organizational, prioritization, communication, delegation and task completion skills.

While little is known about the transition of novice LPNs in nursing homes, the literature indicates that novice RNs in acute care settings do not feel comfortable or confident in their clinical skills for up to one year after hire highlighting the need for well-designed support programs (including consistently assigned and trained preceptors) to promote the successful transition from student nurse to licensed, accountable professional³⁰. Since "first-time experiences" among novice nurses has been associated in the literature with near-miss and adverse-event situations³¹, the findings in this study call attention to the potential patient safety benefit of a novice nurse transition program that provides sufficient time, supervision and support to the novice nurse.

Similarly, nurses employed by temporary staffing agencies attributed workload stress and an unfamiliar practice setting as factors contributing to their medication administration errors. These factors also support the benefit of a collaborative team approach, particularly during "off-shifts", in the implementation of orientation programs to meet the practice needs of this group of

²⁹ Smith, J. & Crawford, L. (2003). *Report of Findings from the 2002 RN Practice Analysis: Linking the NCLEX-RN Examination® to Practice*. Chicago, IL: National Council of State Boards of Nursing; Smith, J. & Crawford, L. (2003). *Report of Findings from the 2003 LPN/LVN Practice Analysis: Linking the NCLEX-PN Examination® to Practice*. Chicago, IL: National Council of State Boards of Nursing.

³⁰ Ebright, P., Urden, L., Patterson, E. & Chalko, B. (2004). Themes Surrounding Novice Nurse Near-Miss and Adverse-Event Situations. *Journal of Nursing Administration*, 34(11):531-538; Casey, K., Fink, R., Krugman, M., Propst, J. (2004). The Graduate Nurse Experience. *Journal of Nursing Administration*, 34(6): 303-311.

³¹ Ebright, P., Urden, L., Patterson, E. & Chalko, B. (2004). Themes Surrounding Novice Nurse Near-Miss and Adverse-Event Situations. *Journal of Nursing Administration*, 34(11):531-538.

nurses. Sharing resources among facilities in the development and implementation of evidence-based orientation and novice nurse transition programs may also serve as a recruitment and retention strategy.

B. Medication Administration

Regardless of the practice setting, the safe administration of medications is a *complex* process that consists of multiple interactive steps involving a variety of clinical staff such as physicians, APRNs, nurses, pharmacists and technicians, and unit secretaries³². The role of the nurse in the administration of medications to patients, as noted by Smith and colleagues, includes the use of psychomotor and affective skills, and clinical reasoning and decision making based on the nurse's analysis and synthesis of information (e.g. recognizing signs and symptoms of changes in clinical conditions, determining medication needs and assessing their effect, and monitoring for drug interactions) relevant to the patient³³. Caring for multiple patients in fast-paced, unpredictable practice environments can complicate the nurse's clinical decision making according to Ebright, et al, who found that frequent interruptions, repetitive unit travel, missing supplies and "disjointed supply sources" compounded the complexity of nurses' work³⁴.

The potential for error is inherent in the medication administration process³⁵. As a consequence, the prevalence of drug therapy in nursing homes increases the risk for medication administration errors. Bernabei and colleagues note that the average U.S. nursing home resident uses six different medications and more than 20% use 10 or more different drugs³⁶. Nurses practicing in nursing homes may care for as many as 40 patients per shift including administering medications as one nurse in this study noted. Marino and colleagues found that a single patient can receive up to 18 doses of medication per day and, according to Morris, a nurse can administer as many as 50 medications per shift³⁷.

A key finding in this study was the frequency of medication administration errors that are associated with a nurse's failure to adhere to the "five rights and three checks", cardinal rules that all nurses learn as students. The failure to adhere to these standards of practice is linked in the literature to patient harm.³⁸ Since more than half of adverse drug events in nursing homes

³² Kohn, L., Corrigan, J., & Donaldson, M. (Eds). (1999). *To err is human: Building a safer health system*. Washington, DC: National Academy Press. Retrieved July 5, 2006 from the World Wide Web:

http://fermat.nap.edu/openbook.php?record_id=9728&page=210; Mayo, A., & Duncan, D. (2004). Nurse Perceptions of Medication Errors: What We Need to Know for Patient Safety. *Journal of Nursing Care Quality*, 19(3): 209-217.

³³ Potter, P., Wolf, L., Boxerman, S., Grayson, D., Sledge, J., Clay, D., & Evanoff, B. (n.d). An Analysis of Nurses' Cognitive Work: A New Perspective for Understanding Medical Errors. *Advances in Patient Safety: From Research to Implementation*. Volume 1, AHRQ Publication Nos. 050021 (1-4). Agency for Healthcare Research and Quality, Rockville, MD. Retrieved December 7, 2006, from the World Wide Web: <http://www.ahrq.gov/downloads/pub/advances/vol1/Potter.pdf>.

³⁴ Ibid.

³⁵ Institute of Safe Medication Practices. (2002). Watch Out for This Turkey: Complacency. *ISMP Medication Safety Alert*, 7(24), 1-2; Brown, A. & Patterson, D. (July 2001). Retrieved January 5, 2007, from the World Wide Web at http://www.ismp.org/Newsletters/acutecare/articles/20021127_2.asp; To Err is Human. *Proceedings of the First Workshop on Evaluating and Architecting System Dependability (EASY '01)*, Göteborg, Sweden. Retrieved October 13, 2005 from the World Wide Web at <http://roc.cs.berkeley.edu/papers/easy01.pdf>.

³⁶ Ibid.

³⁷ Mayo, A., & Duncan, D. (2004). Nurse Perceptions of Medication Errors: What We Need to Know for Patient Safety. *Journal of Nursing Care Quality*, 19(3): 209-217.

³⁸ Santell, J. & Hicks, R. (2005). USP Medication Safety Forum: Medication Errors Involving Geriatric Patients. *Journal on Quality and Patient Safety*, 31(4): 233-237.

are preventable³⁹, striving for consistency in using the five rights and three checks to administer the right medication in the right dose to the right patient by the right route at the right time combined with proactive communication and the application of system prompts that thwart the use of shortcuts and workarounds can prevent medication administration errors and promote safety among a patient population at risk for harm due to age-related physiologic changes.

This study also found that 12 (60%) of the 20 patients who were either the wrong recipient of a drug (11) or who received the wrong drug (9) were transferred to the hospital for monitoring or intervention. While the cost of medication administration errors was beyond the scope of this study⁴⁰, the need to transfer a patient from one setting to another because of a preventable error highlights the potentially significant financial and human costs, and risks that may be incurred.

In addition, the study found that medication administration errors were linked to a variety of human and practice environment factors: incorrect medication order transcriptions; a nurse's failure to verify a patient's drug allergies; knowledge deficits about a medication's correct dosage, desired actions or potential risks; the absence of patient identification bracelets or photographs; the availability of certain medications as an emergency stock drug; drug name confusion; illegible physician handwriting; increased noise levels; the absence of drug references available to the nurse; failure to perform end-of-shift narcotics counts correctly; and defective equipment (i.e. oral syringe). The study findings suggest that understanding that medication administration is a cognitive process in which effective communication and advocacy, critical thinking, decision support, workflow analysis and allocation of appropriate resources play an important role in promoting a safe practice environment.

C. Clinical Judgment

The study found that many nurses involved in clinical judgment errors used some form of clinical reasoning when confronted with a particular patient situation. Many of these nurses had several years of experience but were unable to correctly identify the relationships of specific clinical information or to successfully synthesize the relevance of the information, and ultimately failed to see "the big picture" in the clinical care of their patient. Since 58% of nurses in the study sample were known to have worked from 3 p.m. to 11 p.m., this finding may highlight the need for the availability of experienced nursing staff during "off-shifts" to support clinical decision making.

This study also identified the need for the complete and accurate transfer of clinical data and the opportunity to ask clarifying questions during change-of-shift reports. Change-of-shift handoffs are designed to assist oncoming nursing staff in seeing "the big picture" and appropriately planning patient care including delegating nursing activities to unlicensed assistive personnel⁴¹. To that end, standardization of hand-off communications using a consistent format including, but

³⁹ Gurwitz, J., Field, T., Avorn, J., McCormick, D., Jain, S., Eckler, M., Benser, M., Edmondson, A. & Bates, D. (2000). Incidence and Preventability of Adverse Drug Events in Nursing Homes. *American Journal of Medicine*, 109: 87-94.

⁴⁰ The estimated costs associated with the projected 800,000 annual adverse drug events in US long-term care settings are not available. Source: Aspden, P., Wolcott, J., Bootman, J.L., Cronenwett, L. (Eds). (2006). *Preventing Medication Errors Executive Summary*. Washington, DC: National Academy Press. Retrieved November 1, 2006, from the World Wide Web: http://darwin.nap.edu/execsumm_pdf/11623.

⁴¹ Joint Commission International Center for Patient Safety (n.d.). Strategies to Improve Hand-Off Communication: Implementing a Process to Resolve Questions. Retrieved September 27, 2006, from <http://www.jcipatient.safety.org/show.asp?durki=10742&site=184&return=10737>.

not limited to, the patient's current medical status, resuscitation status, recent lab values, allergies and a problem list is an important error-prevention strategy⁴².

D. Designing Nursing Error Prevention Safeguards

Latent errors (e.g. workflow design defects, improper equipment and inadequate staffing) are often invisible antecedents to active errors (e.g. flawed clinical reasoning and decision-making) by nurses⁴³. The interaction between active errors (nurse-based) and latent errors (system or practice environment-based) underscores the need to design practice environment safeguards that integrate human factors theory. For example, many medication administration and clinical judgment errors in this study were associated with a nurse's failure to adhere to some of the most cardinal rules that nurses learn: never assume and the "five rights and three checks" of medication administration. Mistakes in which the subconscious chooses the wrong automatic response can occur after the nurse learns a specific set of competencies and is able to proceed in the performance of a competency with greater speed⁴⁴. A reduced sense of vigilance in adhering to these cardinal rules can occur when familiar cues and situations cause complacency⁴⁵.

Given the potential for latent and active errors, the incidence of medication administration errors in this study that involved high risk medications further highlights the importance of medication administration strategies that address both human and systems factors. According to the Institute for Safe Medication Practices (ISMP), high risk drug classifications and medications create a greater potential for patient harm when they are used incorrectly⁴⁶. Nine of the 42 nurses involved in medication administration errors incorrectly administered medications from three of the ISMP's high risk drug classifications: Chemotherapeutic agents; oral Hypoglycemics; and Narcotics/Opiates. Additionally, 19 of the 42 nurses incorrectly administered three specific ISMP high-risk medications: low molecular weight Heparin; Insulin; and Coumadin. The implementation of strategies that promote redundancy including independent double checks and read backs to expose potential medication administration errors is linked in the literature with the prevention of medication administration errors⁴⁷.

Another significant finding in this study was the time of day when the nursing errors occurred. The two most frequently occurring time periods when nursing errors occurred in this study may be associated with increased activity and greater potential for interruptions on patient care units due to the administration of regularly scheduled medications, particularly Insulin in the early morning and Coumadin in the evening, evening meal distribution to patients, and for those nurses working 11 p.m. to 7 a.m., preparing for change-of-shift report. This finding has important implications for a nursing unit's workflow design.

⁴² Ibid.

⁴³ Coyle, G. (2005). Designing and Implementing a Close Call Reporting System. *Nursing Administration Quarterly*, 29(1): 57-62.

⁴⁴ Institute for Safe Medication Practices. (2005). Mental slips and lapses: No one is immune. *ISMP Medication Safety Alert*, 3(10), p.1.

⁴⁵ Hughes, R. (2004). First, Do No Harm: Avoiding the Near Misses. *American Journal of Nursing*, 104(5): 83.

⁴⁶ Institute for Safe Medication Practices. (2205). ISMP's List of High-alert medications. Retrieved September 21, 2006, from the World Wide Web: <http://www.ismp.org/Tools/highalertmedications.pdf>.

⁴⁷ Ibid.; Massachusetts Coalition for the Prevention of Medical Errors. (n.d.). *MHA Best Practice Recommendations to Reduce Medication Errors*. Boston, MA: Author.; Joint Commission on Accreditation of Healthcare Organizations (2003). Discipline-specific Role in Safety Nurses: Thirteen Practical Strategies for Preventing Medication Errors. *Joint Commission Perspectives on Patient Safety*, 3(2): 1-2.

Working prolonged hours has been linked to an increased risk for errors among nurses in acute care settings⁴⁸. However, while the specific number of overtime hours or days in a row the nurse worked was unknown and therefore cannot be ruled out as a contributing factor, the Board did not find that fatigue or the number of hours a nurse worked were significant factors among the 78 nurses in this study based on the available documentation.

It is also important to note that as a prerequisite to initial Massachusetts nurse licensure, graduates of Board-approved RN and LPN programs must successfully complete the appropriate national nurse licensure examination. Both the National Council Licensure Examination for Registered Nurses (NCLEX-RN®) and the National Council Licensure Examination for Practical Nurses (NCLEX-PN®) measure a wide variety of nursing competencies related to patient safety that include, but are not limited to, the prevention of errors, the prevention of accidents and injuries, medical and surgical asepsis, the reporting of incidents, advance directives, patient advocacy, delegation and the application of the five rights and three checks in medication administration⁴⁹.

E. Nurses' Perception of Board Actions in Response to Medication Errors

Interestingly, 1099 RN and LPN respondents to an online Institute for Safe Medication Practices (ISMP) survey in February 2005 indicated they feared some form of punitive action by state nursing boards as a result of seven types of medication administration errors including minor (no harm), harmful (but not fatal) and fatal⁵⁰. At least one in five nurses believed their license would be suspended or revoked if the patient died because of their medication error.

However, based on its consideration of mitigating circumstances including patient outcome, in none of the medication administration error cases did the Board suspend or revoke a nurse's license. The Board dismissed 34 (81%) of the cases involving errors in medication administration. Of the remaining cases, the Board issued a written reprimand to six (14%) of the nurses and placed two (5%) nurses on probation. (Table 10 below).

Table 10: February 2005 ISMP On-line Survey: Perceived State Nursing Board Action by Type of Medication Error

Category of Med Error (RN = 1033; LPN = 66)	Written Reprimand		Probation		Suspension		Revocation	
	% RN	% LPN	% RN	% LPN	% RN	% LPN	% RN	% LPN
No harm	15	18	1	2	0	0	0	0
Harm	45	45	22	26	6	9	1	3
Fatal	24	14	43	33	36	23	21	35

⁴⁸ Mayo, A., & Duncan, D. (2004). Nurse Perceptions of Medication Errors: What We Need to Know for Patient Safety. *Journal of Nursing Care Quality*, 19(3): 209-217; Rogers, A., Hwang, W., Scott, L., Aiken, L., & Dinges, D. (2004). The Working Hours of Hospital Staff and Patient Safety. *Health Affairs*, 23(4): 202-212; Kohn, L., Corrigan, J., & Donaldson, M. (Eds). (1999). *To err is human: Building a safer health system*. Washington, DC: National Academy Press. Retrieved July 5, 2006 from the World Wide Web: http://fermat.nap.edu/openbook.php?record_id=9728&page=210.

⁴⁹ National Council of State Boards of Nursing (2003). *2004 Detailed Test Plan for the NCLEX-RN Examination*. Chicago, IL: Author; National Council of State Boards of Nursing (2004). *2005 Detailed Test Plan for the NCLEX-PN Examination*. Chicago, IL: Author.

⁵⁰ Institute of Safe Medication Practices. (2005). *Practitioners anticipate punitive action from licensing boards*. Retrieved September 14, 2005, from the World Wide Web: <http://www.ismp.org/MSAarticles/20050519.htm>.

F. Promoting Nursing Error Recognition and Disclosure

This study identified both individual nurse and practice environment-related factors associated with 78 nursing errors. The prevention of future nursing errors depends on a practice environment that fosters error recognition and disclosure⁵¹. According to Benner, et al, nurses have a practice responsibility to learn from experience and to make that learning available to others⁵². Creating a *learning* environment that eliminates the fear of reprisal when an error occurs, identifies the error's precipitating factors and focuses on the collaborative application of evidence-based practice standards, and disseminates useful information in a timely manner supports patient safety at all levels.

The Board's role in evaluating nursing errors positions it as a centralized data repository from which trends and patterns in nursing errors can be identified and then shared. A collaborative approach to understanding nursing errors allows both the individual nurse and the practice environment to make necessary changes in practice, procedures, policies and equipment. A key finding of the National Academy for State Health Policy suggests that the aggregation of facility-reported error analyses by state reporting systems provides opportunities for learning through the effective dissemination of patient safety alerts and other information that address lessons learned, implementation processes and best practices⁵³. Based on the findings of this study, potential Board-generated non-clinical patient safety alerts that direct nurses to review and apply current practice standards that are drawn from, for example, education, professional associations and employer policies, include the five rights and three checks of medication administration, resuscitation directives, hand-off communications and heat treatment applications.

Providing feedback in the form of patient safety alerts and other aggregated data is an incentive to the reporting of facility-based error analyses to state reporting systems⁵⁴. However, to accomplish the aggregation of useful error-related data requires standardization in error analysis and reporting. The IOM's *To Err is Human* recommends the standardization of report forms and terminology⁵⁵ to improve consistency in data analysis and trending. This study identified some areas in which standardization in reporting would promote identification of all nurse and environment-related variables that could contribute to nursing errors.

⁵¹ Kohn, L., Corrigan, J., & Donaldson, M. (Eds). (1999). *To err is human: Building a safer health system*. Washington, DC: National Academy Press. Retrieved July 5, 2006 from the World Wide Web: http://fermat.nap.edu/openbook.php?record_id=9728&page=210; Wakefield, B., Uden-Holman, T., Wakefield, D. (2005). Development and Validation of the Medication Administration Error Reporting Survey. *Advances in Patient Safety: From Research to Implementation*. Volume 4, AHRQ Publication Nos. 050021 (1-4). Agency for Healthcare Research and Quality, Rockville, MD. Retrieved September 14, 2005, from the World Wide Web: <http://www.ahrq.gov/downloads/pub/advances/vol4/Wakefield2.pdf>.

⁵² Benner, P., Sheets, V., Uris, P., Malloch, K. Schwed, K., Jamison, D. (2002). Individual, Practice and System Causes of Errors in Nursing. *Journal of Nursing Administration*, 32(10): 509-523.

⁵³ Rosenthal, J., & Booth, M. (2005, October). Maximizing the Use of State Adverse Event Data to Improve Patient Safety. Portland, ME: National Academy for State Health Policy.

⁵⁴ Ibid.

⁵⁵ Kohn, L., Corrigan, J., & Donaldson, M. (Eds). (1999). *To err is human: Building a safer health system*. Washington, DC: National Academy Press. Retrieved July 5, 2006 from the World Wide Web: http://fermat.nap.edu/openbook.php?record_id=9728&page=210.

7. Conclusions and Recommendations

The Fiscal Year 2005 Budget required the Board to prepare a compilation of complaint cases involving preventable medical errors that were associated with harm to a patient or health care provider for the purpose of assisting health care providers, hospitals and pharmacies to modify their practices and techniques to avoid error. In response, the Board has analyzed selected CY 2005 closed complaint cases involving nursing errors associated with harm and potential harm to a patient or health care provider for the purpose of recommending evidence-based strategies for use by individual nurses, nurse educators and employers, and regulatory agencies to reduce or prevent the occurrence of nursing errors.

Nursing competence and the infrastructure of the nurse's practice environment have implications for safe nursing practice and the prevention of nursing errors. This study also indicates that while the Board may be perceived by some nurses as punitive, its actions following its investigation and evaluation of nursing complaints do not bear this out.

Having identified some of the possible antecedent individual nurse and practice environment factors associated with nursing errors, the Board recommends a number of error-prevention strategies for use by individual nurses, nurse educators, employers, and regulatory agencies. These strategies include:

Nurse-based Error Prevention Strategies

- Apply the "five rights and three checks" of medication administration
- Verify patient identity prior to any patient care intervention
- Never assume!
- Check for patient allergies
- Minimize distractions when administering medications
- Read back verbal orders and patient allergies to the prescriber
- Determine the purpose of a medication before administering
- Require independent double checks and compare for verification
- Insure easy access to information regarding resuscitation directives
- Apply heat treatments in accordance with accepted standards
- Actively participate in the systematic evaluation of an employing agency's clinical policies and procedures
- Advocate for standardized hand-off communications using a consistent format including, but not limited to, the patient's current medical status, resuscitation status, recent lab values, allergies and a problem list
- Actively participate in interdisciplinary root cause analyses when nursing errors occur
- Review standards of care related to:
 - five rights and three checks of medication administration
 - heat treatment applications
 - resuscitation directives
 - hand-off communications

Nursing Education-based Error Prevention Strategies

- Develop and implement evidence-based curriculum modules designed to promote medication administration error recognition among student nurses and to eliminate barriers to voluntary disclosure of such errors

- Design and implement simulations which challenge the student nurse's skills in clinical reasoning, organization, prioritization, communication, workspace maintenance and delegation, as appropriate, regarding:
 - five rights and three checks of medication administration
 - heat treatment applications
 - resuscitation directives
 - hand-off communications

Practice Environment-based Error Prevention Strategies

- Partner with other facilities to share resources in the development and implementation of evidence-based orientation and transition programs for temporary staff and novice nurses
- Adopt evidence-based facility policies, procedures and best practices related to:
 - five rights and three checks of medication administration
 - heat treatment applications
 - resuscitation directives
 - hand-off communications
- Insure review of facility policies and standards of care related to the following in all orientation, graduate nurse transition and continuing education programs:
 - medication administration
 - heat treatment applications
 - resuscitation directives
 - hand-off communications
- Adopt strategies to regularly audit nursing practice to verify ongoing compliance with standards of care (e.g. audit compliance with the Five Rights and Three Checks of medication administration)
- Design nursing unit workflow to reduce interruptions during medication administration
- Standardize hand-off communications using a consistent format including, but not limited to, the patient's current medical status, resuscitation status, recent lab values, allergies and a problem list as recommended by the Joint Commission on Accreditation of Healthcare Organizations
- Incorporate unit-level nursing staff in the systematic evaluation of clinical policies and procedures
- Insure patient identification mechanisms are available at all times for all patients
- Insure that information about each patient's advance directives is easily available to all direct-care staff
- Collaborate with unit-level nursing staff in the creation of a non-punitive practice environment that supports voluntary reporting of medication administration errors and "close calls" by nurses, and which recognizes medication administration errors as opportunities to improve medication administration safety
- Systematically monitor the effectiveness of changes made to the practice environment as the result of nursing errors
- Aggregate data from root cause analyses to identify patterns
- Require the dispensing of medications in unit-dose
- Limit access to concentrated morphine solution; list concentration in mg/mL
- Insure medication administration workspaces are free of distraction and noise
- Require the listing of brand and generic names on MARs
- Require the affixation of name alerts where look or sound-alike medications are stored

- Require independent double checks and read backs
- Promote computerized medication order entry

Board-based Error Prevention Strategies

- Design an evidence-based “culture of safety” model curriculum unit for entry-level nursing education programs
- Explore collaboration with the Betsy Lehman Center for Patient Safety and Medical Error Reduction, the Massachusetts Coalition for the Prevention of Medical Errors, professional organizations, nursing education, employers, and other regulatory agencies to develop and implement methodologies for the routine collection and analysis of nursing errors in which the Board has taken action and issue patient safety alerts to share timely, specific information (i.e., lessons learned)
- Explore mechanisms for the standardized collection of information related to complaints received by the Board regarding an individual nurse’s practice
- Issue patient safety alerts regarding:
 - five rights and three checks of medication administration
 - heat treatment applications
 - resuscitation directives
 - hand-off communications
- Support collaborative efforts among nurses, employers, professional associations, risk management and regulatory agencies in the creation of a non-punitive practice environment that supports voluntary medication administration error reporting by nurses by recognizing medication administration errors as opportunities to improve medication administration safety

Areas for Further Study

- External validation of the findings from this study
- Identification of nurses’ perceptions about medication administration errors and the barriers to medication administration error detection and voluntary reporting
- Identification of strategies to reduce nursing home-based nursing errors among novice nurses and nurses employed by temporary staffing agencies
- Identification of nurses’ clinical reasoning related to cardiopulmonary resuscitation in selected cases
- Creation of a competency-based remediation program developed collaboratively between the nurse, the nurse’s employer and the Board based on a cause and effect study of individual nursing error

The Board’s goal in evaluating complaints regarding an individual nurse’s practice is to insure the provision of competent nursing care by qualified RNs and LPNs. The Board recognizes that nursing care is a complex process – regardless of setting - that involves both safe practice environments and competent nurses who practice in accordance with accepted standards of care within those environments.

APPENDIX 1
CY 2005 CLOSED COMPLAINT CASES: FREQUENCY OF ALLEGATION AND CASE DECISION

Allegation⁵⁶ (Nature) Code	Dismissed	Other⁵⁷	License revoked	License suspended	Probation	Reprimand	Stayed suspension	Voluntary surrender	Total	% all CY 05 closed cases (N=661)
Alcohol abuse	0	0	1	0	0	0	0	1	2	0.3%
Abandonment	4	0	0	1	0	0	0	0	5	0.8%
Breach of contract	2	0	1	1	0	0	0	2	6	0.9%
Practice beyond license	7	0	0	0	0	0	0	0	7	1.1%
Criminal conviction	3	0	3	1	0	0	0	1	8	1.2%
Child support failure	0	0	0	2	0	0	0	0	2	0.3%
Improper CS prescribing	2	0	0	0	0	0	0	0	2	0.3%
Drug abuse	11	1	4	1	1	0	0	5	23	3.5%
Drug diversion	53	4	19	0	5	1	2	30	114	17.2%
Discipline in another jurisdiction	14	1	10	3	1	0	1	7	37	5.6%
Embezzlement or theft	1	0	0	0	0	0	0	0	1	0.2%
Fraud (nonhealth)	4	0	1	0	0	1	0	0	6	0.9%
Failure to adhere to practice standards	118	1	4	3	23	30	0	10	189	28.6%
Inferior or improper work	1	0	0	0	0	1	0	0	2	0.3%
Improper CS documentation	9	1	11	0	5	1	0	10	37	5.6%
Incompetence	2	0	0	0	0	0	0	1	3	0.5%
Improper documentation	0	0	0	0	0	1	0	0	1	0.2%

⁵⁶ Allegation, or Nature Code as it is referenced in the DHPL Complaint system (a complaint system that tracks receipt of complaints by the Board), should not be confused with a finding that has been proven. Allegation codes are assigned to a complaint case during initial intake by DHPL staff based on the complainant's report of what allegedly occurred.

⁵⁷ Non-disciplinary: Consent agreement in effect placing license on hold until conditions are met, and duplicates.

<i>Continued</i> Allegation (Nature) Code	Dismissed	Other ⁵⁸	License revoked	License suspended	Probation	Reprimand	Stayed suspension	Voluntary surrender	Total	% all CY 05 closed cases (N=661)
Inappropriate conduct w/ a patient/client	2	0	0	1	0	0	0	0	3	0.5%
Misrepresent licensure	1	0	0	0	0	0	0	0	1	0.2%
Medication error	48	0	0	1	3	4	0	0	56	8.5%
Malpractice	1	0	0	0	0	0	0	0	1	0.2%
Misrepresentation	1	0	0	0	0	0	0	0	1	0.2%
Expired or inactive license	3	0	0	0	0	0	0	0	3	0.5%
No license	2	0	0	1	0	0	0	0	3	0.5%
Other (no longer used)	0	0	0	0	0	0	0	1	1	0.2%
Practice w/ a suspended or revoked license	1	0	0	0	0	0	0	0	1	0.2%
Patient abuse	21	1	0	1	8	3	3	3	40	6.1%
Patient neglect	15	0	0	0	1	4	0	2	22	3.3%
Practice while impaired	8	0	0	1	0	1	0	4	14	2.1%
SARP violation	0	0	0	0	0	0	0	5	5	0.8%
SARP violation (no longer used)	0	0	0	0	0	0	0	1	1	0.2%
Sexual misconduct	4	0	2	0	0	0	0	1	7	1.1%
Theft of CS	1	0	1	0	0	0	0	4	6	0.9%
Unethical conduct	9	0	0	1	0	0	0	0	10	1.5%
Unprofessional conduct	32	0	2	0	2	3	1	1	41	6.2%
Total	380	9	59	18	49	50	7	89	661	
% of all CY 05 closed cases (N = 661)	57.5%	1.4%	8.9%	2.7%	7.4%	7.6%	1.1%	13.5%	100.0%	

⁵⁸ Non-disciplinary: Consent agreement in effect placing license on hold until conditions are met, and duplicates.
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APPENDIX 2

TAXONOMY

(Adapted with permission from NCSBN Taxonomy of Error, Root Cause Study and Practice Responsibility)

1. Type of licensure (RN, LPN, NA, NM, NP, PC – specify)
2. Single incident, one nurse Yes/No/Unknown (Y/N/U)
3. Multiple incidents, one nurse Yes/No/Unknown (Y/N/U)
4. Date of incident
5. Time of incident
6. Is there a companion case? Yes/No/Unknown (Y/N/U)

Patient profile

7. Patient age Age/Unknown (Age/U)
8. Patient gender Male/Female/Unknown (M/F/U)
9. Patient primary language Language/Unknown (Language/U)
10. Patient primary medical or psychiatric diagnosis
11. Patient relevant secondary diagnoses
12. Patient characteristics
 - 12.1. Cognitive impairment
 - 12.2. Sensory deficits/impairments
 - 12.3. Communication limitations
 - 12.4. Altered LOC
 - 12.5. Patient Agitation/combativeness
 - 12.6. Other: _____
 - 12.7. Unknown

Licensee profile

13. Licensee age at last birthday at time of incident
14. Number of years licensed at time of incident
15. Licensee gender: Male/Female/Unknown (M/F/U)
16. Licensee primary language: English/Non-English/Unknown (E/Non-E/U)
17. Country of basic nursing education: _____
18. Basic nursing education
 - 18.1. PN
 - 18.2. RN-Diploma
 - 18.3. RN-Associate Degree
 - 18.4. RN-Baccalaureate Degree
 - 18.5. RN-Generic Masters
 - 18.6. Unknown
 - 18.7. Year of graduation
 - 18.8. School of Nursing
19. Licensee's primary nursing role at the time of the incident
 - 19.1. Direct caregiver
 - 19.2. Supervisory
 - 19.3. Both direct care and supervisory
 - 19.4. Unknown
20. Number of years licensee has been in position at the time incident was reported
21. Work start time and work end time on date incident occurred

- 21.1. Work start time
- 21.2. Work end time
- 21.3. Unknown

22. Type of shift

- 22.1. 8 hour
- 22.2. 10 hour
- 22.3. 12 hour
- 22.4. On call
- 22.5. Other: _____
- 22.6. Unknown

23. For assignment of licensee when reported incident occurred, the number of patients assigned and/or number of staff overseen

Type of assignment	# of patients	# staff overseen
23.1. Direct patient care	a.	b.
23.2. Team leader	a.	b.
23.3. Charge nurse	a.	b.
23.4. Nurse manager/supervisor	a.	b.

24. Nurse working overtime when incident occurred. Yes/No/Unknown (Y/N/U)

25. Nurse working overtime on the same unit when the incident occurred? Yes/No/Unknown (Y/N/U)

26. Nurse working overtime on a different unit when the incident occurred? Yes/No/Unknown (Y/N/U)

27. Number of days in a row the licensee had worked:

- 27.1. First day back after time off
- 27.2. 2-3
- 27.3. 4-5
- 27.4. 6-7
- 27.5. 8 or more
- 27.6. Unknown

28. Was nurse working in a temporary capacity?

- 28.1. Covering another nurse's assignment
- 28.2. Floating to another unit
- 28.3. Floating from float pool
- 28.4. Temporary agency nurse (short-term assignment)
- 28.5. Travel nurse/long-term assignment
- 28.6. Not applicable
- 28.7. Unknown

NF. Identified Nurse Factors that contributed to the licensee's nursing error (check all that apply)

NF.1. Licensee's inexperience with clinical event/procedure/treatment/patient condition

- NF.2. Unfamiliar setting
- NF.3. Stress/high work volume
- NF.4. Fatigue/lack of sleep
- NF.5. Licensee's drug/alcohol impairment/substance abuse
- NF.6. Licensee's functional ability deficit
- NF.7. Licensee's mental health issues
- NF.8. Lack of team support
- NF.9. Conflict
- NF.10. Not applicable
- NF.11. Unknown
- NF.12. Other: _____

29. Has nurse had prior corrective action/discipline by employer?

- 29.1. No
- 29.2. Yes regarding clinical skills/judgment/critical thinking
- 29.3. Yes, regarding interpersonal issues
- 29.4. Yes, regarding misconduct
- 29.5. Yes, regarding attendance issues
- 29.6. Unknown

30. Has nurse had prior discipline by a state nursing board?

- 30.1. No
- 30.2. Yes regarding clinical skills/judgment/critical thinking
- 30.3. Yes regarding interpersonal issues
- 30.4. Yes regarding misconduct
- 30.5. Unknown

Setting Profile

31. Setting

- 31.1. Hospital
 - 31.1.1. Emergency room
 - 31.1.2. ICU
 - 31.1.2.1. Cardiac
 - 31.1.2.2. Medical
 - 31.1.2.3. Neonatal
 - 31.1.2.4. Pediatric
 - 31.1.2.5. Surgical
 - 31.1.3. Labor & delivery
 - 31.1.4. Nursery
 - 31.1.5. Oncology
 - 31.1.6. Long-term care
 - 31.1.7. Operating room
 - 31.1.8. Outpatient
 - 31.1.9. Pediatrics
 - 31.1.10. Psychiatric
 - 31.1.11. Radiology, nuclear
 - 31.1.12. Radiology, special procedures
 - 31.1.13. Respiratory care
 - 31.1.14. Recovery room (PACU)

- 31.1.15. Sub Acute
- 31.1.16. Rehabilitation
- 31.2 Nursing home
- 31.3 Adult day health
- 31.4 Assisted living
- 31.5 Out-patient/day surgery
- 31.6 Other out-patient facility
- 31.7 Mental health facility
- 31.8 Provider office/ambulatory care
- 31.9 Home care
- 31.10 School
- 31.11 Unknown

32. Size of facility

- 32.1. Fewer than 6 beds
- 32.2. 6-24 beds
- 32.3. 25-49 beds
- 32.4. 50-99 beds
- 32.5. 100-199 beds
- 32.6. 200-299 beds
- 32.7. 300-399 beds
- 32.8. 400-499 beds
- 32.9. 500 or more beds
- 32.10. Unknown

33 Type of medical record/patient charting

- 33.1. Electronic documentation
- 33.2. Electronic prescriber orders
- 33.3. Electronic medication administration system
- 33.4. Paper documentation
- 33.5. Unknown

34.. Patient Outcomes/Categories of Nursing Errors (adapted from the Massachusetts Board of Registration in Pharmacy's *Report on Study of Quality Related Event (Medication administration error) Reports January 1, 2004, to December 31, 2004*)

- 34.1. Potential to cause harm (P): *error occurred and did not reach patient*
- 34.2. Error with No Harm (NH): *error occurred that reached patient and no harm resulted*
- 34.3. Error with Harm (H): *error occurred that reached patient and harm resulted*
- 34.4. Sentinel Event (S): *error occurred that reached patient and serious permanent harm or death resulted*

Categories of Nursing Error and Contributing Factors

35. Attentiveness/Surveillance

- 35.1 Undetected critical life functions
- 35.2 Undetected physiological signs and symptoms
- 35.3 Undetected psycho-emotional signs and symptoms
- 35.4 Undetected social or spiritual needs
- 35.5 Not detecting faulty or missing patient information

- 35.6 Lack of monitoring for unsafe period of time
- 35.7 Not recognizing substandard care provided by others
- 35.8 Undetected error
- 35.9 Undetected complications of treatment and procedures
- 35.10 Lack of monitoring of staff performance
- 35.11 Other: _____

36. Intervening

- 36.1. Lack of timely intervention
- 36.2. Lack of skillful intervention
- 36.3. Error in performance of intervention
- 36.4. Delay in procedure or treatment
- 36.5. Directing inappropriate or substandard care of other personnel
- 36.6. Operating new equipment without orientation
- 36.7. Inappropriate intervention, not what is needed
- 36.8. Lack of tailoring intervention to patient's history and anticipated needs
- 36.9. Other: _____

37. Professional Responsibility or Patient Advocacy

- 37.1. Nurse erroneously chooses not to notify physician/provider of patient condition
- 37.2. Lack of follow-up on problems
- 37.3. Disregard for patient needs
- 37.4. Specific patient requests or concerns unattended
- 37.5. Inappropriate withholding of treatment
- 37.6. Missed or diminished sense of patient safety
- 37.7. Lack of respect for patient/family concerns and dignity
- 37.8. Patient abandonment
- 37.9. Boundary crossing/violations
- 37.10. Breach of confidentiality
- 37.11. Nurse attributes responsibility to others
- 37.12. Undisclosed and unauthorized interventions
- 37.13. Disregards critical patient need citing agency policy or reimbursement issues
- 37.14. Other: _____

38. Clinical judgment

- 38.1. Ineffective monitoring of patient's condition (strategies of monitoring not effective)
- 38.2. Physician/provider not notified of change in patient condition
- 38.3. Clinical implications of signs, symptoms and/or interventions not recognized
- 38.4. Clinical implications of signs, symptoms and/or interventions misinterpreted
- 38.5. Following orders, routine, culture (system think) without considering specific patient condition
- 38.6. Poor judgment in delegation and supervision of other staff members
- 38.7. Inappropriate acceptance of assignment or delegation beyond the nurse's knowledge, skills and abilities
- 38.8. Lack of knowledge
- 38.9. Other: _____

39. Interpretation of authorized provider orders

- 39.1. Failed to follow standard protocol/order

- 39.2. Missed authorized provider order
- 39.3. Misinterpreted telephone or verbal order
- 39.4. Misinterpreted authorized provider handwriting
- 39.5. Undetected authorized provider error resulting in execution of an inappropriate order
- 39.6 Other: _____

40. Prevention

- 40.1 Preventive measures for patient well being not taken
- 40.2. Breach of infection precautions
- 40.3. Did not conduct safety checks prior to use of equipment
- 40.4. Other: _____

41. Documentation

- 41.1. Pre-charting/untimely charting
- 41.2. Inaccurate charting
- 41.3 Incomplete charting
- 41.4. Charting on wrong patient record
- 41.5 Other: _____

42. Safe Medication Administration

- | | <u>Medication ordered</u> | Drug class ⁵⁹ | <u>Medication Given</u> | Drug class ⁶⁰ |
|--|---------------------------|--------------------------|-------------------------|--------------------------|
| 42.1. Drug name | a. | | b. | |
| 42.2. Dose | a. | | b. | |
| 42.3. Frequency | a. | | b. | |
| 42.4. Intended route | | | | |
| 42.5. Route given | | | | |
| 42.6. Wrong drug | | | | |
| 42.7. Wrong dose | | | | |
| 42.8. Wrong route | | | | |
| 42.9. Wrong time | | | | |
| 42.10. Wrong patient | | | | |
| 42.11. Wrong reason | | | | |
| 42.12. Patient identification | | | | |
| 42.13. Communication breakdown | | | | |
| 42.14. Drug name confusion | | | | |
| 42.15. Labeling/package confusion | | | | |
| 42.16. Medication available as floor stock | | | | |
| 42.17. Nurse knowledge deficit | | | | |
| 42.17.a. Desired action medication misunderstood | | | | |
| 42.17.b. Nurse did not know risks of medication | | | | |
| 42.17.c. Incorrect use | | | | |
| 42.18. Miscalculation of dosage or infusion rate | | | | |
| 42.19. Computer error | | | | |
| 42.20. Transcription error | | | | |
| 42.21. Preprinted medication order confusion | | | | |

⁵⁹ Added 11/15/05 to be consistent with TERCAP version 10252005.

⁶⁰ Added 11/15/05 to be consistent with TERCAP version 10252005

- 42.22. Drug preparation error
- 42.23. Drug allergy to medication
- 42.24. Drug incompatibilities
- 42.25. Drug devices
- 42.26. Other: _____
- 42.27. Unknown

Health Care Team

- 43. Other health team members involved (check all that apply)
 - 43.1. Patient
 - 43.2. Supervisory nurse/personnel
 - 43.3. RN, non-supervisor
 - 43.4. LPN, non-supervisor
 - 43.5. APRN, non-supervisor
 - 43.6. Physician
 - 43.7. Other prescribing provider
 - 43.8. Pharmacist
 - 43.9. Unlicensed Assistive Personnel
 - 43.10. Medication aide
 - 43.11. Other support staff
 - 43.12. Other: _____
 - 43.13. Not applicable
 - 43.14. Unknown
- 44. Contributing factors related to staffing (check all that apply)
 - 44.1. Lack of supervisory/management support
 - 44.2. Lack of experienced nurses
 - 44.3. Lack of nursing support staff
 - 44.4. Lack of clerical support
 - 44.5. Lack of other health care team support
 - 44.6. Other: _____
 - 44.7. Not applicable
 - 44.8. Unknown
- 45. Health care team and work environment (check all that apply)
 - 45.1. Unit level conflict/non-supportive environment
 - 45.2. Breakdown of health care team communication
 - 45.3. Inability to work together as a team
 - 45.4. Lack of team awareness of patient as a whole, goals, objectives
 - 45.5. Other: _____
 - 45.6. Not applicable
 - 45.7. Unknown
- 46. Other health care team factors (check all that apply)
 - 46.1. Illegible handwriting
 - 46.2. Intimidating/threatening behavior
 - 46.3. Lack of patient education
 - 46.4. Lack of patient counseling
 - 46.5. Lack of family/caregiver education

- 46.6. Not applicable
- 46.7. Other: _____
- 46.8. Unknown

Other Systems Issues

47. Environmental Issues (check all that apply)

- 47.1. Poor lighting
- 47.2. Increased noise level
- 47.3. Frequent interruptions
- 47.4. Lack of adequate supplies/equipment
- 47.5. Equipment failure
- 47.6. Physical hazards
- 47.7. Similar/misleading labels (other than medications)
- 47.8. Other: _____
- 47.9. Not applicable
- 47.10. Unknown

48. Communication factors (check all that apply)

- 48.1. Communication systems equipment failure
- 48.2. Interpersonal communication breakdown/conflict
- 48.3. Unit level communication breakdown
- 48.4. No adequate channels for resolving disagreements
- 48.5. Medical record(s) not available
- 48.6. Essential patient safety information missing from chart
- 48.7. Computer down
- 48.8. Preprinted orders-inappropriately used (other than medications)
- 48.9. Other: _____
- 48.10. Not applicable
- 48.11. Unknown

49. Leadership/Management factors (check all that apply)

- 49.1. Unclear scope and boundaries of authority/responsibility
- 49.2. Poor supervision/support by others
- 49.3. Inadequate/non-current policies/procedures
- 49.4. Assignment or placement of inexperienced personnel
- 49.5. Unreliable nurse assistant/extender
- 49.6. Nurse shortage, sustained, at institution level
- 49.7. Overwhelming assignments
- 49.8. Forced choice in critical circumstances
- 49.9. Other: _____
- 49.10. Not applicable
- 49.11. Unknown

50. Backup and Support Factors (check all that apply)

- 50.1. Ineffective system for medical coverage
- 50.2. Ineffective system for Pharmacy coverage
- 50.3. Ineffective system for laboratory coverage
- 50.4. Ineffective system for radiology/other diagnostic coverage
- 50.5. Lack of adequate response by lab/x-ray/pharmacy

- 50.6. Lack of adequate response by other departments
- 50.7. Other: _____
- 50.8. Not applicable
- 50.9. Unknown

51. Other factors (check all that apply)

- 51.1. Lack of orientation/training
- 51.2. Lack of ongoing education/training
- 51.3. Other: _____
- 51.4. Not applicable
- 51.5. Unknown

Nurse Outcomes

52. Employer Actions

- 52.1. Nurse reported to state nursing board
- 52.2. Nurse dismissed
- 52.3. Nurse resigned in lieu of dismissal
- 52.4. Nurse reassigned to another patient unit/assignment
- 52.5. Nurse required to take continuing education courses related to knowledge deficit evident in event
- 52.6. Nurse referred for psychological counseling
- 52.7. Nurse referred for substance abuse counseling
- 52.8. Nurse resigned and voluntarily left nursing profession
- 52.9. Other _____
- 52.10. Not applicable
- 52.11. Unknown

53. Board of Nursing Actions

- 53.1. Dismissed, discipline not warranted
- 53.2. Dismissed without prejudice because discipline not warranted
- 53.3. License revoked
- 53.4. License suspended
- 53.5. Probation
- 53.6. Reprimand
- 53.7. Stayed suspension
- 53.8. Voluntary surrender

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Complainant

- Patient
- Family
- BON
- Employer
- HCQ
- Other

Primary Cause of Nursing Error

- ☐ Lack of Attentiveness/Surveillance

- ☐ Lack of Faulty Intervention
- ☐ Lack of Professional Responsibility/Patient Advocacy
- ☐ Inappropriate Clinical Judgment
- ☐ Missed or Mistaken Order
- ☐ Lack of Prevention
- ☐ Documentation Errors
- ☐ Medication administration errors

APPENDIX 3 DESCRIPTION OF NURSING ERROR CATEGORIES

TERCAP PRACTICE CATEGORY DESCRIPTION	NURSING ERROR CATEGORY
<u>Attentiveness/Surveillance:</u> Nurse is knowledgeable about patient's care and maintains vigilance to be aware of what is happening with patient and staff. Nurse observes and stays on top of what is happening with the patient.	Lack of attentiveness/surveillance
<u>Intervening:</u> Nurse acts correctly on behalf of patient	Faulty intervention
<u>Professional Responsibility or Patient Advocacy:</u> Nurse demonstrates professional responsibility and understands the nature of the nurse-patient relationship. Nurse puts the needs of patient first. Advocacy refers to the expectation that a nurse acts responsibly in protecting patient/family vulnerabilities.	Lack of professional responsibility or patient advocacy
<u>Clinical Judgment:</u> Nurse demonstrates appropriate decision making, critical thinking and sound clinical judgment.	Inappropriate clinical judgment
<u>Interpretation of Authorized Provider Orders:</u> Nurse interprets authorized provider orders.	Missed or mistaken order
<u>Prevention:</u> Nurse follows usual and customary measures to prevent risks, hazards or complications due to illness or hospitalization.	Lack of prevention
<u>Documentation:</u> Nurse ensures complete, accurate and timely documentation.	Documentation errors
<u>Safe Medication Administration:</u> Nurse administers the right dose of the right medication via the right route to the right patient at the right time for the right reason.	Medication administration errors

APPENDIX 4A
VIOLATIONS OF THE FIVE RIGHTS OF MEDICATION ADMINISTRATION:
MEDICATION ADMINISTERED TO THE WRONG PATIENT

MEDICATION/DRUG CLASS GIVEN TO THE WRONG PATIENT	MEDICATION/DRUG CLASS ORDERED FOR PATIENT (<i>What the patient was supposed to receive</i>)	PATIENT EFFECT AS DESCRIBED IN CASE FILE
Regular insulin (Antidiabetic agent)	Regular insulin (Antidiabetic agent)	Transferred to hospital for monitoring of unknown duration. Later returned to facility. No additional information provided.
NPH Insulin (Antidiabetic agent)	NPH Insulin (Antidiabetic agent)	Remained at facility – monitored by staff for unknown duration. No additional information provided.
<ul style="list-style-type: none"> • Coumadin (Anticoagulant agent) • Depakote (Anticonvulsant agent) • Lasix (Diuretic agent) • Trazadone (Antidepressant agent) 	<ul style="list-style-type: none"> • Coumadin (Anticoagulant agent) • Depakote (Anticonvulsant agent) • Lasix (Diuretic agent) • Trazadone (Antidepressant agent) 	Remained at facility. No additional information provided.
NPH Insulin (Antidiabetic agent)	NPH Insulin (Antidiabetic agent)	Transferred to hospital for 24 hours of monitoring; received IV. Later returned to facility. No additional information provided.
NPH Insulin (Antidiabetic agent)	Unknown (Oral hypoglycemic agent)	Transferred to hospital for monitoring of unknown duration. Later returned to facility. No additional information provided.
<ul style="list-style-type: none"> • Glyburide (Oral hypoglycemic agent) • Hydrochlorothiazide (Diuretic agent) • Isosorbide (Antianginal agent) • Remeron (Antidepressant agent) 	There were no medications ordered for patient.	Remained at facility – vital signs and finger sticks every four hours for evening and night shift. No additional information provided.
Zosyn (Penicillin)	Ceftriaxone (Cephalosporin)	Patient experienced “severe nausea”. Transferred to hospital for monitoring of unknown duration. Later returned to facility. No additional information provided.
Humalog Insulin (Antidiabetic agent)	There were no medications ordered for patient.	Remained at facility. No additional information provided.

MEDICATION/DRUG CLASS GIVEN TO THE WRONG PATIENT	MEDICATION/DRUG CLASS ORDERED FOR PATIENT <i>(What the patient was supposed to receive)</i>	PATIENT EFFECT AS DESCRIBED IN CASE FILE
<ul style="list-style-type: none"> • Oscal (Mineral) • Seroquel (Antipsychotic agent) • Trilafon (Antipsychotic agent) • Trileptol (Anticonvulsant agent) • Zantac (Antiulcer agent) 	<ul style="list-style-type: none"> • Parlodel (Antiparkinson agent) • Serevent (Bronchodilator) • Sinemet (Antiparkinson agent) • Zantac (Antiulcer agent) 	Remained at facility for monitoring of unknown duration during which patient experienced increased lethargy; was unable to eat for short period. No additional information provided.
<ul style="list-style-type: none"> • Digoxin (Antiarrhythmic agent) • Lasix (Diuretic agent) • Neurontin (Anticonvulsant agent) • Toprol (Antiarrhythmic/antihypertensive agent) • Wellbutrin (Antidepressant agent) • Zoloft (Antidepressant agent) 	<ul style="list-style-type: none"> • Aspirin (Nonsteroidal anti-inflammatory agent) • Atenolol (Antiarrhythmic/antihypertensive agent) • Digoxin (Antiarrhythmic agent) • Lipitor (Antilipemic agent) 	Patient had already received medications as ordered. As result, patient received a second dose of Digoxin. Transferred to hospital; admitted to Telemetry Unit for monitoring for 24 hours. No additional information provided.
Novolin (Antidiabetic agent)	Novolin Insulin (Antidiabetic agent)	Remained at facility. Blood sugar checks every two hours as ordered for unknown time frame; received IV. No additional information provided.

APPENDIX 4B
VIOLATIONS OF THE FIVE RIGHTS OF MEDICATION ADMINISTRATION:
WRONG DRUG ADMINISTERED TO PATIENT

MEDICATION/DRUG CLASS ORDERED	MEDICATION/DRUG CLASS GIVEN	PATIENT EFFECT AS DESCRIBED IN CASE FILE
Percocet (Opioid analgesic) ⁶¹	Morphine sulfate (Opioid analgesic) ⁶²	Remained at facility for monitoring of unknown duration. No additional information provided.
Morphine sulfate (Opioid analgesic)	Xanax (Sedative hypnotic agent)	Patient transferred to hospital for monitoring of unknown time period; received IV. Later returned to facility. No additional information provided.
Atenolol (Beta blocker)	Lisinopril (Ace inhibitor)	Developed face and neck swelling; Benadryl administered. Transferred to hospital for monitoring of unknown duration; received IV. No additional information provided.
Foltx (Vitamin)	Folex (Antineoplastic agent)	Received 37 doses over 19-day period. No additional information provided.
Name of medication (s) unknown	<ul style="list-style-type: none"> • Aricept (Central nervous system agent) • Depakote (anticonvulsant agent) • Zyprexa (Antipsychotic) 	Unable to arouse. Transferred to hospital for monitoring of unknown duration. Later returned to facility. No additional information provided.
Oxycotin (Opioid analgesic)	Klonopin (Anticonvulsant agent)	Received three 2 mg tablets (normal dose Klonopin not to exceed 1.5 mg daily in three divided doses). Experienced change in level of "responsiveness". Transferred to

⁶¹ Patient had a documented allergy to both Morphine and Percocet.

⁶² Case also reflects administration of wrong dose.

MEDICATION/DRUG CLASS ORDERED	MEDICATION/DRUG CLASS GIVEN	PATIENT EFFECT AS DESCRIBED IN CASE FILE
		Emergency Room, receiving Narcan enroute ⁶³ . No additional information provided.
<ul style="list-style-type: none"> • Dyazide (Diuretic agent) • K-tab (Electrolyte) • Lipitor (Antilipemic agent) • Lopid (Antilipemic agent) • Prozac (Antidepressant agent) • Reminyl (Acetylcholine inhibitor agent) • Zantac (Antiulcer agent) 	<ul style="list-style-type: none"> • Baclofen (Muscle relaxant agent) • Coumadin (Anticoagulant agent) • Elavil (Antidepressant agent) • K-lor (Electrolyte) • Oxycotin (Opioid analgesic) • 	Admitted to hospital for 48 hours. No additional information provided.
NPH insulin (Antidiabetic agent)	<ul style="list-style-type: none"> • Regular insulin (Antidiabetic agent) 	Admitted to hospital for evaluation. No additional information provided.
<ul style="list-style-type: none"> • Glyburide (Oral hypoglycemic agent) • Lasix (Diuretic agent) • Lipitor (Antilipemic agent) • Lovenox (Anticoagulant agent) • Protonix (Antiulcer agent) • Enalapril (Antihypertensive agent) 	<ul style="list-style-type: none"> • Plavix (Platelet inhibitor agent) • Calcium (Mineral) • Celebrex (Nonsteroidal anti-inflammatory agent) • Timoptic⁶⁴ (Ophthalmic beta-blocker) 	Hospitalized for monitoring. Returned to facility. No additional information provided.

⁶³ Narcan is effective only in reversing respiratory depression caused by opiates, not against other drug-induced respiratory depression.

⁶⁴ Systemic beta-blocking effects of Timoptic can mask some signs and symptoms of hypoglycemia; diabetic patients must be monitored carefully.

APPENDIX 4C
VIOLATIONS OF THE FIVE RIGHTS OF MEDICATION ADMINISTRATION:
WRONG DOSE ADMINISTERED TO PATIENT

MEDICATION/DRUG CLASS AND DOSE ORDERED	MEDICATION/DRUG CLASS AND DOSE GIVEN	CONTRIBUTING FACTOR AND PATIENT EFFECT AS DESCRIBED IN CASE FILE
Roxanol (Opioid analgesic) <i>2 milligrams</i>	Roxanol (Opioid analgesic) <i>2 milliliters (40 milligrams)</i>	Nurse failed to verify dosage when preparing medication (Nurse was unable to clearly read medication order; checked with another nurse who said she had given "2" which nurse interpreted to mean 2 milliliters). Patient remained at facility for monitoring of unknown duration. No apparent ill effect.
Percocet (Opioid analgesic) ⁶⁵ <i>7.5 milligrams/325 milligrams acetamenophen</i>	Morphine sulfate (Opioid analgesic) ⁶⁶ <i>60 milligrams</i>	Nurse failed to compare drug label with drug order. Also, nurse and oncoming nurse failed to perform end-of-shift count correctly resulting in failure to identify overage of Percocet and underage of morphine. Patient experienced vomiting "a few hours later". Remained at facility. Head of bed elevated for next 8 hours. Blood pressure to be checked every hour until 8 a.m. (18 hours after drug administered); MD to be notified if below 90/50. Vital signs remained within normal limits. No additional information provided.
Morphine sulfate (Opioid analgesic) <i>2.5 milligrams (20 mg/ml = 0.125 ml)</i>	Morphine sulfate (Opioid analgesic) <i>25 milligrams (1.25 ml)</i>	Medication dropper reportedly difficult to read; nurse was able to note the 1 milliliter level. Nurse checked

⁶⁵ Patient had a documented allergy to both Morphine and Percocet.

⁶⁶ Also reflects administration of wrong drug.

MEDICATION/DRUG CLASS AND DOSE ORDERED	MEDICATION/DRUG CLASS AND DOSE GIVEN	CONTRIBUTING FACTOR AND PATIENT EFFECT AS DESCRIBED IN CASE FILE
		Medication Administration Record for the correct amount to draw up (0.125 milliliters). Nurse “interpreted” amount to be 1.25 milliliters. Patient received 10 times prescribed amount of drug. No additional information provided.
Fluzone (Vaccine) <i>0.5 milliliters</i>	Fluzone (Vaccine) <i>1.0 milliliters</i>	Nurse failed to verify dosage when preparing medication. Patient remained at facility; monitored for 72 hours. No apparent ill effects. Also administered 1.0 ml to 20 additional patients.
Morphine sulfate (Opioid analgesic) <i>10 milligrams</i>	Morphine sulfate (Opioid analgesic) <i>50 milligrams</i>	Drug container had two labels from pharmacy: 20 mg/5 ml appeared above 20 mg/1 ml. Nurse did not see second label with the correct concentration; calculated dosage based on the first, incorrect label. Calculated on first label. Patient received incorrect dose every hour for four hours. Patient expired.
Morphine sulfate (Opioid analgesic) <i>5 milligrams</i>	Morphine sulfate (Opioid analgesic) <i>5 milliliters (100 milligrams)</i>	Nurse had correctly administered Morphine sulfate 5 milligrams to another patient on an earlier occasion. In this case, the medication was obtained from the Emergency Kit because it had not been received yet from the Pharmacy. Morphine sulfate available in Emergency Kit was a different dilution than what was ordered. Nurse did not verify dosage. May reflect knowledge deficit related to correct dosage. Patient was transferred to hospital after 7 th Narcan dose. No additional information available.

MEDICATION/DRUG CLASS AND DOSE ORDERED	MEDICATION/DRUG CLASS AND DOSE GIVEN	CONTRIBUTING FACTOR AND PATIENT EFFECT AS DESCRIBED IN CASE FILE
Novolin 70/30 Insulin (Antidiabetic agent) <i>16 Units</i>	Novolin 70/30 Insulin (Antidiabetic agent) <i>54 Units</i>	Nurse failed to verify dosage when preparing medication. Patient transferred to Emergency Room for monitoring of unknown duration. Returned to facility. No additional information provided.

APPENDIX 4D
VIOLATIONS OF THE FIVE RIGHTS OF MEDICATION ADMINISTRATION:
DRUG ADMINISTERED BY THE WRONG ROUTE

MEDICATION/DRUG CLASS AND ROUTE TO BE ADMINISTERED	MEDICATION/DRUG CLASS AND ROUTE DRUG GIVEN	CONTRIBUTING FACTOR AND PATIENT EFFECT AS DESCRIBED IN CASE FILE
Morphine sulfate (Opioid analgesic) <i>Administer sublingual (i.e. under the tongue)</i> ⁶⁷	Morphine sulfate (Opioid analgesic) <i>Administered by mouth "with a little water"</i> ⁶⁸	Nursing staff had dispensed earlier doses of Morphine sulfate in a medication cup (i.e. by mouth administration) rather than by the prescribed sublingual route since the patient thought the dropper for sublingual administration was actually for an "injection", causing the patient to be frightened. There was no evidence that this had been discussed with the patient's physician to identify an alternative that would provide for rapid pain relief while not causing fear to the patient.

⁶⁷ Sublingual administration of drugs promotes rapid absorption and effect onset since drugs are not absorbed by the gastrointestinal tract.

⁶⁸ Drugs administered by the enteral route (i.e. by mouth) are absorbed by the gastrointestinal tract and are therefore absorbed more slowly and have a slower onset than those administered sublingually.

APPENDIX 5

BOARD ACTIONS BY TYPE OF NURSING ERROR

	Lack of attentiveness/ surveillance	Faulty intervention	Lack professional responsibility/ patient advocacy	Inappropriate clinical judgment	Missed or mistaken order	Lack of prevention	Documentation errors	Medication errors	Total
Dismiss w/o prejudice, discipline not warranted	5	4	1	4	1	2	0	34	51
License revocation	0	0	0	0	0	0	0	0	0
License suspension	0	0	0	0	0	0	0	0	0
Probation	0	0	1	8	0	0	0	2	11
Reprimand	0	0	4	5	0	1	0	6	16
Stayed suspension	0	0	0	0	0	0	0	0	0
Voluntary surrender	0	0	0	0	0	0	0	0	0
Total	5	4	6	17	1	3	0	42	78